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ABSTRACT

This report describes the growth in cognitive skills and achievement, and the continuities and discontinuities experienced in school and at home by the eighth-grade cohort of the National Education Longitudinal Study of 1988 (NELS:88) during the 2 years between the study's base year (1988) and the first-followup (1990) surveys. The report examines school change in view of the almost universally experienced transition to high school, with findings about patterns of school transition and changes in students' perceptions of safety and overall learning environment. Major changes in home life and family are also outlined. Finally, the report examines the tested achievement of the cohort by exploring gains and the content areas in which they occurred. By the followup, about 6% of the students were no longer in school, and half reported that they left simply because they did not like school. In terms of simple achievement gains, students gained in all four subject categories of science, mathematics, social studies, and reading comprehension, although gain patterns were complex. Data from NELS:88 and its followups are a rich source of information for policy makers and education practitioners. Four appendixes discuss standard errors, research methodology, an overview of the program, and an annotated bibliography of 30 NELS:88 publications. (Contains 14 tables, 40 figures, and 70 references.) (Author/SLD)

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Statistical Analysis Report **September 1995**

National Education Longitudinal Study of 1988

Two Years Later: Cognitive Gains and School Transitions of NELS:88 Eighth Graders

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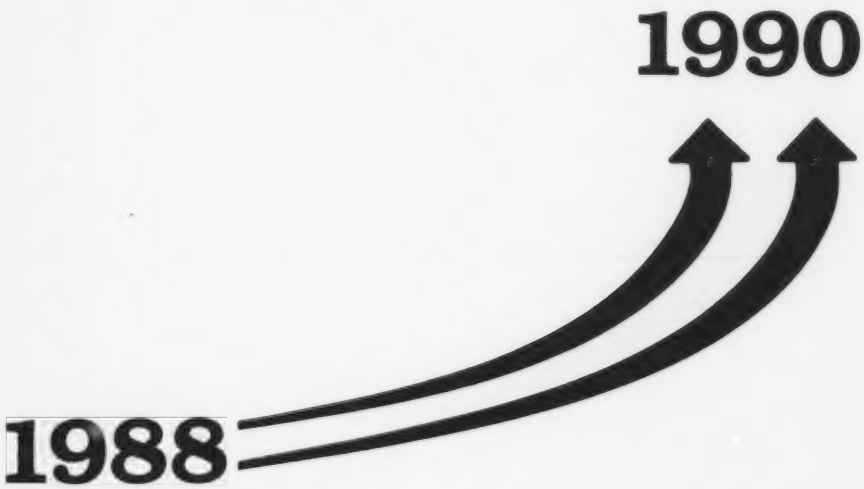

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National Education Longitudinal Study of 1988

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September 1995

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Summary of Major Findings

This report describes the growth in cognitive skills and achievement, and the continuities and discontinuities experienced in school and at home by the eighth grade cohort of the National Education Longitudinal Study of 1988 (NELS:88) during the two years between the study's base year (1988) and first follow-up (1990) surveys. Educationally, although disengagement may proceed by degrees, one of the most dramatic transitions that a member of the cohort may undergo is dropping out of school. By 1990, some 1988 eighth graders were indeed dropouts; this report describes their characteristics and the reasons they gave for dropping out of school. This report also examines school change in terms of the almost universally experienced transition to a new school for high school. In particular, this report presents findings on patterns of school transition--changing from a public eighth grade school to a private high school or vice versa--and changes in students' perceptions of safety and overall learning environment after moving from a typically more homogeneous middle school environment to a more heterogeneous high school environment. Additionally, this report summarizes major changes in home life and family, such as the divorce or remarriage of a parent, that also occurred during cohort members' transition to and/or early years of high school. Finally, this report examines the tested achievement of the eighth grade cohort two years later by addressing three basic questions: (1) How much did students gain in achievement in the two years following eighth grade?; (2) Who gained?; and (3) In what content areas were achievements made?

Chapter 1 introduces NELS:88 and this report. Findings are presented in chapters 2-4. Highlighted below are selected findings from chapters 2, 3, and 4.

Chapter 2--Early-Grade Dropouts

As of the spring of 1988, virtually all 1988 eighth graders expected to graduate from high school: 99 percent of the eighth grade cohort reported they expected to complete high school. Two years later, however, about 6 percent of 1988 eighth graders were not enrolled in school. One of the National Education Goals is to increase the high school graduation rate to at least 90 percent by the year 2000. In order to achieve this goal, therefore, it is clear that students who are at-risk of dropping out must be targeted early in their high school careers, for within two years of eighth grade some 6 percent have already dropped out.[1] Who, then, are these early-grade dropouts and why do they decide to leave school early?

Characteristics of Eighth Grade Cohort Dropouts in 1990.

- Eighth grade cohort dropouts were disproportionately represented in the lowest socioeconomic (SES) quartile: 58 percent of NELS:88 dropouts were from the lowest SES quartile, 20 percent from the second lowest quartile, 16 percent from the second highest quartile and 7 percent from the highest quartile.

- After controlling for SES, differences in dropout rates among non-Asian minority subgroups disappeared. Within the lowest SES quartile, 14 percent of Hispanics, 12 percent of blacks, 17 percent of whites, and 19 percent of American Indian students left school between eighth

[1] Only four percent of eighth grade cohort dropouts reported in 1990 that they did not expect to eventually complete high school or get a GED.

and tenth grades. In contrast, five percent of Asian students left school during this period. This finding holds across all quartiles of SES.

- The incidence of dropping out for eighth graders scoring in the lowest quartile on the 1988 cognitive test was 26 times greater (13%) than that for students scoring in the highest quartile (0.5%).

- About 64 percent of eighth graders who dropped out of school were not from a traditional two-parent family, compared to 36 percent of their classmates who remained in school.

Reason Students Gave for Dropping Out of School.

- Fifty-one percent of NELS:88 dropouts reported they left school simply because they did not like it.

- Males and females differed in the responses they gave for dropping out of school: Many NELS:88 female dropouts cited pregnancy (31%) or marriage (24%) as their reason for dropping out. Over fifty percent (52%) of males reported they left school because they couldn't get along with teachers, and close to 20 percent left because they had found a job.

Chapter 3--School and Family Transitions

While the vast majority of students (89%) moved to a different school building for high school, there was great variation in the pattern and consequences of this transition. (Findings on school transitions pertain to only cohort members who remained in school as of the spring of 1990.)

A Typology of Sector Change. Ninety-eight percent of public school eighth graders were in public schools two years later (1990). The pattern of sector transition was more complex for private school[2] eighth graders, however.

- Of 1988 eighth graders who changed to a different type of school for high school, 66 percent changed from a private eighth grade school to a public high school, 25 percent changed from a public eighth grade school to a private high school and 9 percent changed from a private eighth grade school to another type of private school.

- More than one third of other private school (38%) and Catholic school eighth graders (37%) changed to public school, while students attending an independent school in eighth grade changed to public school at a rate half (15%) that of Catholic and other private school students.

[2] Three kinds of private schools are distinguished in this analysis report: (1) Catholic schools, (2) independent schools, that is, members of the National Association of Independent schools (NAIS), and (3) all other private schools.

Changes in Students' Learning Environment. For one of several first follow-up student questionnaire items designed to assess school climate, students were asked to compare their first year of high school to the year before.[3]

- In terms of academic standards and discipline, for the majority (73%) of the cohort still in school and attending high school, their first year of high school was thought to be more difficult than the year before.

- For about one out of five students (19%), the social milieu of their new school was perceived as more unfriendly and lonely than that of their eighth grade school.

To supplement students' retrospective accounts of their new learning environment, change in academic demand between eighth grade and high school was assessed a second way through students' reports of the number of hours they spent on homework in eighth grade and high school. Specifically, this analysis calculated the difference between hours spent on homework in the subject areas of math, science, English, and history in eighth grade and hours spent on homework in high school two years later. Students were then classified as doing more, less or the same amount of homework in high school than in eighth grade.

- Regardless of subject matter, slightly more than one-half of 1988 eighth graders spent about the same amount of time on homework in high school as they did in eighth grade: for math, 55 percent; for science, 57 percent; for English, 54 percent; and for history, 56 percent.

- Of the remaining 45 percent, approximately one-quarter of the students reported doing more homework in high school than in eighth grade and slightly more than 15 percent said they were doing less.

- Females, Asian students, students in the highest SES quartile and students scoring in the highest test quartile on the base year cognitive tests were more likely to have increased their homework time since eighth grade than other groups of students.

School Safety and Crime as an Aspect of School Climate. Change in school safety between eighth grade and high school was examined through students' perceptions of the overall safety of their school and reports of petty school crime. In both the base year and first follow-up, students were asked about both their perceptions of the safety of their current school overall and the frequency with which they experienced thefts, threats of physical harm, and drug solicitations while at school.

- In terms of students' perceptions of the overall safety of their school, 86 percent of the students perceived their current high school to be just as safe (or unsafe) as their eighth grade school.

- In terms of students' reports of school crime, the data suggest that, in some respects, high schools in 1990 were safer than eighth grade schools in 1988.

[3] Readers are cautioned that for the majority of the 1988 cohort this particular questionnaire item was a retrospective question. Retrospective questions may be susceptible to bias due to error in memory. This item was a retrospective question for the majority of the 1988 cohort because the majority of the cohort was in their second year of high school as of 1990.

- Thefts and threats of physical harm decreased in the move to high school; however, encounters with drug pushers increased: 14 percent of the cohort reported being approached more in high school than in eighth grade to buy drugs, whereas only 5 percent reported fewer encounters with drug pushers.

- In terms of subgroup differences in high school crime, no one racial/ethnic group appeared to be experiencing more or fewer unsafe situations in high school. It is noteworthy that white (15%) and Hispanic (15%) students were more likely than black (10%) students to experience an increase since eighth grade in the frequency with which they were approached to buy drugs.

- Based on students' reports of thefts, threats, and drug solicitations, students who changed from a public eighth grade school to a private high school experienced a safer high school environment than students who moved from a private eighth grade school to a public high school: nearly a quarter (23%) of private to public change students experienced an increase in thefts, whereas 10 percent of public to private school change students experienced an increase.

Overall School Climate. Other types of differences were also perceived between students' eighth grade school and high school learning environments, though the lack of a strong pattern suggests that students perceived little discontinuity between eighth grade and high school.

- Overall, change in learning environments was perceived in terms of better student-teacher relationships, better teacher listening, and more school spirit.

- In terms of subgroup differences, however, blacks were almost twice as likely (19%) as Asian (9%) and white students (12%) to perceive a change to poorer teacher-student relationships in high school.

Family Transitions. Many 1988 eighth graders (both dropouts and students who remained in school) also experienced home and family changes.[4] More than 60 percent of the members of the cohort experienced at least one form of family change between 1988 and 1990. Some family changes that students reported happened to them between 1988 and 1990 were: the death of a close relative, experienced by 29 percent of the cohort; the move to a new home, encountered by 19 percent; and the divorce of their parents during the two years, reported by 8 percent of the cohort.

Chapter 4--Student Growth in Cognitive Skills

In the base year (1988) and again in the first follow-up (1990), students were administered a battery of cognitive tests in the content areas of mathematics, science, reading, and history/citizenship/geography. In investigating students' cognitive growth between 1988 and 1990, two types of gain scores were used (1) **simple gain scores** (the overall difference between a students' 1990 mathematics score, for example,

[4] Readers are cautioned that for some cohort members (members for whom an event occurred some time prior to the spring of 1990 when the question was asked) this particular questionnaire item was a retrospective question. Retrospective questions are more susceptible than prospective questions to bias due to error in memory.

and his/her 1988 score), and (2) **proficiency scores,** or quality of gain scores (for example, change in level of proficiency in mathematics; that is, students' mastery of a specific set of mathematics skills).

The reading test consisted of two levels of proficiency (or mastery of skills).

Reading Level 1: Simple reading comprehension, including reproduction of detail and/or the author's main thought.

Reading Level 2: Ability to make inferences beyond the author's main thought and/or understand and evaluate relatively abstract concepts.

The mathematics test consisted of four levels of proficiency (or mastery of skills).

Math Level 1: Simple arithmetical operations on whole numbers.

Math Level 2: Simple operations with decimals, fractions, and roots.

Math Level 3: Simple problem solving, requiring conceptual understanding and/or the development of a solution strategy.

Math Level 4: Conceptual understanding and complex problem solving.

How Much Did Students Gain in the Two Years Following Eighth Grade?

- In terms of simple gains, students gained in all four content areas, with the biggest 1988 to 1990 gains in science, followed by relatively equivalent gains in mathematics and history/citizenship/geography, and substantially smaller gains in reading comprehension.

- The size of the gains were quite substantial (with the exception of reading comprehension), suggesting that this period of development is accompanied by considerable cognitive growth in the areas of science, mathematics, and history/citizenship/geography.

Who Gained, in What Content Areas, and at What Skill Levels?

- While the biggest gains occurred in science for virtually all subpopulations, Asian and white students showed a disproportionately greater gain in science than did Hispanic and black students.

- Males showed significantly greater gains in science than did female students.

- Students in the highest SES quartile showed considerably greater gains in science than did their counterparts in the lowest SES quartile. This differential in favor of high-SES students was much greater in science than in any of the other content areas.

- Students attending Catholic schools or other private schools showed significantly greater gains in science than did their public school counterparts.

- Students in the vocational high school program showed smaller gains in reading comprehension than students in the academic high school program, and smaller gains in mathematics and science than their counterparts in the general or academic curriculum.

While the mean gains on the respective test score scales (simple gains) appeared quite similar for some subpopulations, the quality of gains, or students' proficiency (mastery of particular skills), differed by subpopulations, particularly in mathematics.

- Asian and white students demonstrated proportionately greater learning gains in conceptual and problem solving skills, whereas black and Hispanic students showed greater gains in basic arithmetical operations.

- Students who reported taking high level mathematics courses not only showed more overall growth than students with only general math, but also showed significantly more growth in the area of problem solving.

- Students attending Catholic and independent private schools showed significantly greater growth in the mathematics problem solving area than did public school students.

Foreword

The National Education Longitudinal Study of 1988 (NELS:88) provides a wealth of information about factors that influence student academic performance and social development and the processes through which these factors operate. Under the sponsorship of the National Center for Education Statistics (NCES), with additional support from the National Science Foundation (NSF), the Office of Bilingual Education and Minority Languages Affairs (OBEMLA), and other entities and agencies, NELS:88 is being conducted in several waves.

The first wave (the 1988 base year) recorded the experiences of a nationally representative sample of eighth graders within a nationally representative sample of their schools. The second wave (the 1990 first follow-up, which provides the basis for this report) traced them to the tenth grade. The third wave (the 1992 second follow-up) followed them to the twelfth grade, while the fourth wave (the 1994 third follow-up) followed them out of high school. The longitudinal design of NELS:88 permits researchers not only to observe the critical transition of students from middle or junior high school to high school, but also to identify early student, school, and parental experiences that promote student learning.

Though this report relies primarily on data gathered from members of the eighth grade cohort themselves, readers should be aware that NELS:88 takes into consideration the much larger environment in which the cohort functions and develops. Thus, in addition to student test and self-report data, NELS:88 incorporates supporting data from students' school principals, parents, and teachers to identify additional factors that affect student achievement. NELS:88 also incorporates archival sources such as high school transcripts that record grades and course-taking patterns.

It is our hope that this report will be of interest to policymakers and education practitioners, as well as to education researchers. Policymakers can use NELS:88 results to turn statistics into practical, workable programs to help solve the problems facing the American educational system and its students. Researchers may be inspired by this report to use NELS:88 data to explore their own interests and concerns, and to thereby further illuminate the condition and prospects of American secondary education.

Paul Planchon
Associate Commissioner of Education Statistics

Jeffrey Owings
Chief, Longitudinal and Household Studies Branch

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The NELS:88 Technical Review Panel advised the National Center for Education Statistics' contractor for NELS:88--the National Opinion Research Center (NORC) at the University of Chicago--on design and questionnaire development issues. Members of the panel were Jerald G. Bachman, Program Director and Research Scientist, Institute for Social Research, University of Michigan; Gordon Ensign, Supervisor, Testing and Evaluation, State of Washington; Lyle V. Jones, Director, L.L. Thurstone Psychometric Laboratory, University of North Carolina; Nancy L. Karweit, Principal Research Scientist, Center for Social Organization of Schools, Johns Hopkins University; Patricia Shell, formerly the Superintendent of the Brazosport Independent School District, Freeport, Texas; Marshall S. Smith, then Dean, College of Education, Stanford University; Richard J. Murnane, Associate Professor of Education, Harvard University; and John Stiglmeier, formerly the Director of the Information Center on Education, New York State Department of Education. In addition, the following individuals served the study as consultants: Anthony Bryk of the University of Chicago, Senta Raizen of the National Center for Improving Science Education, and Aaron Pallas of Michigan State University.

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Steven J. Ingels was the Project Director for the base year (Calvin Jones directed the initial stages of the study); Ingels was also Project Director for the NELS:88 first follow-up (Penny Sebring directed earlier phases of the project).

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Table of Contents

Page

Summary of Major Findings iii

Foreword ix

Acknowledgements xi

List of Tables xiv

List of Figures xvi

Chapter 1: Introduction 1

Chapter 2: The Transition from Student to Dropout: Early-Grade Dropouts 9

Chapter 3: School and Family Transitions 29

Chapter 4: Cognitive Gains of 1988 Eighth Graders from 1988 to 1990 65

Chapter 5: Summary and Conclusions 105

References 109

Appendices

Appendix A: Standard Errors and Sample *Ns* 115

Appendix B: Methodological and Technical Notes 169

Appendix C: Overview of NCES NELS Program and NELS:88 First Follow-up 195

Appendix D: Bibliography of NELS:88 Analysis Publications 211

List of Tables

Table		Page
1	Selected background characteristics of the eighth grade class of 1988 in 1990	8
2.1	Percentages of 1988 eighth graders who dropped out of school by spring of 1990 by selected background characteristics	11
2.2	Percentages of 1988 eighth graders who dropped out of school by spring of 1990 by race/ethnicity controlling for socioeconomic (SES) status	14
2.3	Percentages of 1988 eighth graders who dropped out of school and who remained in school by selected background characteristics	19
2.4	Reasons given for dropping out of school by sex	22
2.5	Percentages of 1988 eighth graders who dropped out of school and who remained in school by "0", "1", or "2 or more" "at-risk" factors	25
3.1	Percentages of 1988 eighth graders who attended a particular type of school in eighth grade (1988) by the type of school attended in high school (1990)	33
3.2	Percentages of 1988 eighth graders doing the same, more, or less homework in high school (1990) than in eighth grade (1988) by selected background characteristics	38
3.3	Percentages of 1988 eighth graders who reported that the following acts of school crime occurred the same number, more, or fewer times in their 1990 school than in their 1988 eighth grade school by selected backgrounds characteristics	45
3.4	Percentages of 1988 eighth graders who reported that the following acts of school crime happened to them at least once in the base year (1988) and first follow-up (1990)	46
3.5	Percentages of 1988 eighth graders reporting they now agree or disagree (changed from opposite view held in base year) with the following statement by selected background characteristics	50
3.6	Percentages of students reporting they agree with the following statement about their eighth grade (1988) and first follow-up (1990) schools by selected background characteristics	51
3.7	Percentages of 1988 eighth graders reporting they now agree or disagree (changed from opposite view held in base year) with the following statements by selected background characteristics	54
3.8	Percentages of 1988 eighth graders reporting they agree or strongly agree with the following statements about their eighth grade school (1988) and first follow-up school (1990)	56

List of Figures

Figure		Page
2.1	Percentages of 1988 eighth graders who were out of school in 1990 by socioeconomic status (SES) quartile	13
2.2	Percentages of dropouts reporting they left school for the following reasons by sex (ten most frequently reported reasons)	24
3.1	Percentages of 1988 eighth graders who changed to a different school type for high school	32
3.2	Percentages of 1988 eighth graders who reported they agreed or strongly agreed with the following statements about their first year of high school relative to the year before	36
3.3	Percentages of 1988 eighth graders who did and did not experience a change in the following safety related behaviors in the move from eighth grade to high school	44
3.4	Percentages of 1988 eighth graders who reported the following events happened in their lives between 1988 and 1990 (ten most frequently reported events)	61
4.1	Gains in mathematics by racial/ethnic groups matched on low and high socioeconomic (SES) status	68
4.2	Mathematics gains by proficiency levels for low and high socioeconomic (SES) status race/ethnicity groups	69
4.3	Gains in mathematics by sex	70
4.4	Math gains by proficiency levels and sex	71
4.5	Gains in mathematics by socioeconomic (SES) status	72
4.6	Math gains by proficiency levels and socioeconomic (SES) status	73
4.7	Gains in mathematics by math courses taken	74
4.8	Math gains by proficiency levels and math courses taken	75
4.9	Gains in mathematics by type of school attended in 1990	76
4.10	Math gains by proficiency levels and type of school attended in 1990	77
4.11	Gains in mathematics by curriculum type	78

List of Figures (cont'd)

Figure		Page
4.12	Math gains by proficiency levels and curriculum type	79
4.13	Gains in reading by racial/ethnic groups	81
4.14	Reading gains by proficiency levels and race/ethnicity groups	82
4.15	Gains in reading by sex	83
4.16	Reading gains by proficiency levels and sex	84
4.17	Gains in reading by socioeconomic (SES) status	85
4.18	Reading gains by proficiency levels and socioeconomic (SES) status	86
4.19	Gains in reading by type of school attended in 1990	87
4.20	Reading gains by proficiency levels and type of school attended in 1990	88
4.21	Gains in reading by curriculum type	89
4.22	Reading gains by proficiency levels and curriculum type	90
4.23	Gains in science by racial/ethnic groups	91
4.24	Gains in science by sex	92
4.25	Gains in science by socioeconomic (SES) status	93
4.26	Gains in science by science courses taken	94
4.27	Gains in science by type of school attended in 1990	95
4.28	Gains in science by curriculum type	96
4.29	Gains in history/citizenship/geography by racial/ethnic groups	97
4.30	Gains in history/citizenship/geography by sex	98
4.31	Gains in history/citizenship/geography by socioeconomic (SES) status	99
4.32	Gains in history/citizenship/geography by type of school attended in 1990	100
4.33	Gains in history/citizenship/geography by curriculum type	101
4.34	Mean gains by cognitive area and by racial/ethnic groups	102

Chapter 1: Introduction

This report presents selected descriptive findings from the first resurvey of the NELS:88 eighth grade class of 1988. Owing to the collection of two waves of data, it is now possible to examine the lives of this same cohort longitudinally in terms of the changes and stabilities they experienced in the two years after leaving eighth grade.

This chapter presents background information on the purpose and design of NELS:88 and the multiple levels of analysis supported by the study. Also discussed in this chapter are the specific analytical and substantive topics addressed in this report. Following chapters present findings on the school, familial, and cognitive changes experienced by 1988 eighth graders.

Purpose of NELS:88

The major features of NELS:88 include the planned integration of student, dropout, parent, teacher, and school studies, initial concentration on an eighth grade cohort with follow-ups at two-year intervals, inclusion of supplementary components to support analyses of demographically distinct subgroups, and design linkages to previous longitudinal studies and other current studies. Multiple research and policy objectives are addressed through the NELS:88 design. The study is intended to produce a general purpose dataset for the development and evaluation of educational policy at all government levels. Part of its aim is to inform decision makers, education practitioners, and parents about the changes in the operation of the educational system over time, and to show the effects of various elements of the system on the lives of the individuals who pass through it. Specifically, NELS:88 focuses on a number of interrelated policy issues, including:

- Students' academic growth over time, and the family, community, school, and classroom factors that promote or inhibit student learning,
- The transition of different types of students from eighth grade to secondary school (and later, from secondary school to postsecondary education or the labor force),
- The influence of ability grouping and differential course-taking opportunities on future educational experiences and outcomes,
- Determinants and consequences of dropping out of (and of returning to) the educational system,
- Changes in educational practices over time,
- The role of the school in helping the disadvantaged, and
- The school experiences and academic performance of language-minority students.

Base Year Design

The base year survey was conducted in the spring term of the 1987-1988 school year. A clustered, stratified national probability sample of 1,052 public and private eighth grade schools participated. Almost 25,000 students across the United States participated in the base year study. The sample represents the

nation's eighth grade population, totaling over three million eighth graders in more than 38,000 schools in the spring of 1988.[1]

Questionnaires and cognitive tests were administered to each selected student. The student questionnaire inquired about school experiences, activities, attitudes, self-concept, plans, selected background characteristics, and language proficiency. The school principal completed a questionnaire about the school, two teachers of each student were asked to answer questions about the student, about themselves, and about their school, and one parent of each student was surveyed about family characteristics and student activities.

First Follow-Up Design

The first follow-up survey was primarily conducted in the spring term of the 1989-1990 school year. As in the base year, students were asked to complete a questionnaire and cognitive test. The cognitive test was designed to measure tenth-grade achievement and cognitive growth between 1988 and 1990 in the subject areas of mathematics, science, reading, and social studies (history/geography/civics).

The first follow-up of NELS:88 comprised the same components as the base year study--with the exception of the parent survey--and a freshened sample was added to the student component to achieve a representative sample of the nation's sophomores. Some 18,221 students participated (of 19,363 selected),[2] with 1,043 dropouts taking part (of 1,161 identified), for a total of 19,264 participating students and dropouts. In addition, 1,291 principals took part in the study, as did 9,987 teachers.

Of the 19,264 students participating in the first follow-up study, 17,424 were members of the eighth grade cohort.[3] Of the 17,424 panel members, 16,659 participated as students and 765 participated as dropouts.

A more detailed description of the National Center for Educational Statistics (NCES) National Education Longitudinal Studies program in general, and of the NELS:88 first follow-up in particular, is provided in Appendix C of this report.

Levels of Analysis Supported by NELS:88 Data

This report examines the 1988 eighth grade cohort in 1990. Such an approach--in which changes from the 1988 baseline are measured two years later, represents the longitudinal level of analysis in NELS:88. However, the NELS:88 first follow-up sample was designed to support cross-sectional analysis as well.

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[1] Exclusions from the base year study were made if the student was mentally handicapped, not proficient in English, or had a physical or emotional problem which would have made participation in the survey unduly difficult. About 5.3 percent of the students at base year were excluded from the sample.

[2] The first follow-up sample is a subsample of the base year student sample. For more information on first follow-up sampling, see Appendix C.

[3] The difference of 1,840 participating respondents between 19,264 participating first follow-up sample members and 17,424 participating eighth grade cohort members is "freshened" students who are not part of the eighth grade longitudinal cohort and eighth grade cohort members who were nonrespondents in the base year.

For example, it is also possible to use NELS:88 data to examine spring term 1990 sophomores as well as to compare 1990 sophomores (NELS:88) with 1980 sophomores (High School & Beyond - HS&B). A nationally representative sample of 1990 sophomores can be analyzed because the eighth grade cohort has been "freshened" with 1990 sophomores who were not in eighth grade in the United States in the 1987-1988 school year, and because members of the eighth grade cohort who were not 1990 sophomores (for example, those who dropped out, or were in a grade other than grade ten) can be excluded from analysis for this purpose.

A report has been prepared to illustrate each of these levels of analysis--longitudinal, cross-sectional, and repeated cross-sectional--of NELS:88 first follow-up data.

This report--***Two Years Later: Cognitive Gains and School Transitions of NELS:88 Eighth Graders***--illustrates cross-wave (longitudinal) analysis of the NELS:88 data at a descriptive level. It examines the changes that eighth graders underwent between 1988 and 1990 and suggests the pattern of stability and change that characterized their transition to high school. Information is also given about the characteristics of 1988 eighth graders who subsequently dropped out of school, and achievement gains as measured by the NELS:88 cognitive test battery are reported in detail.

The descriptive summary ***A Profile of the American High School Sophomore in 1990*** illustrates the cross-sectional level of analysis supported by NELS:88, which takes a snapshot of 1990 sophomores at a single point in time. The report describes the learning and achievement, decision making, and educational expectations of the nation's spring 1990 sophomores.

America's High School Sophomores: A Ten Year Comparison, 1980 - 1990 illustrates an inter-cohort or repeated cross-sectional approach. The report compares 1980 High School and Beyond (HS&B) sophomores to 1990 NELS:88 sophomores. It identifies changes over this 10-year span in in-school and out-of-school activities, academic achievement, self-concept and values, and plans and aspirations of the nation's tenth graders.

Many other NCES-sponsored reports using NELS:88 data have been completed, or are planned. Many topics not touched upon in this report are addressed in other reports, while other topics that have been broached in this report are treated in greater depth elsewhere, or are the subject of planned future reports. Appendix D lists other NCES NELS:88 analysis reports. Appendix D also provides abstracts of the contents of these reports.

Focus of this Report

Analytical Focus. NELS:88 data can be used in two distinct ways. One use of NELS:88 data is descriptive and aims at estimation--specifically, the estimation of descriptive and relational population and subgroup statistics. Such descriptive data are usually expressed as means (for example, mean gain in mathematics score from 1988 to 1990) or proportions (for example, the percentages of 1988 eighth graders who report studying more in high school than in eighth grade) and answer questions about the size and distribution of educational phenomena or about the characteristics of students and the educational system. For example, descriptive data tell us how many students have dropped out of school, and who they are--that is, whether they are more likely to be male or female, or how much more likely high achievement students are to stay in school. But descriptive accounts, while they answer the question "how many", cannot conclusively answer the question "why". A second way of using the data, however, can address such questions.

Questions of "why" involve using the data inferentially or relationally. Inferential uses of the data aim at inferring cause. They can assume either a research or a policy focus. Research investigations into educational processes and outcomes test hypotheses about the underlying causes of educational phenomena. Such investigations aim at theoretical understanding, regardless of whether such understanding has direct implications for current policies and practices. Policy analysis concerns the subset of explanatory variables that are manipulable, that is, can be altered through the institution of or changes in practices, programs, policies or other interventions. As such, policy analysis provides a guide to what works, what does not work, what can be improved or should be changed.

This report is descriptive in nature. Its aim is to describe the patterns of change and stability occurring among the NELS:88 eighth grade cohort. One of the major reasons for undertaking a longitudinal study is to gain an understanding of how or why individuals change, or remain the same, over time (intraindividual change), and how some individuals may experience change differently from other individuals (interindividual change). Specifically, in this report we describe how individuals changed in terms of school setting and family situation during their move from eighth grade to high school, and who may have changed in what way. For example, students' study habits are examined. Did they study more, less, or the same amount of time in high school relative to eighth grade?

Change measurement: questionnaire data. In this report--using questionnaire responses--change is investigated in three ways. (1) One way change is measured is through questionnaire items that asked students specifically how their lives may have changed since the base year (1988). The investigation of family change reported in chapter 3 exemplifies this approach. Student self-reports of change, however, are retrospective reports that may be susceptible to bias owing to possible recollection errors. (2) A second manner in which change is measured is through comparison of aggregate base year scores on some item to aggregate first follow-up scores on the same item. An example of this is the description of school crime presented in Table 3.5 (e.g., in the base year, 49 percent of eighth graders had something stolen from them at least once, whereas, in the first follow-up, 44 percent of eighth graders reported being the victim of a theft at least once). While not susceptible to memory bias, side by side comparisons of aggregate percentages may mask change if equal numbers of students changed in opposite directions (thereby canceling any record of change). Moreover, comparisons of aggregate percentages do not permit investigation of differential change--that is, who or what changed and how. In order to address questions of differential change, change is also investigated through individual change (or difference) scores. (3) Change scores make use of the data longitudinally by utilizing individual observations from two different points in time, the base year (time 1) and first follow-up (time 2). Through this method, it is possible to describe, for example, not only how school crime may have changed in the move from eighth grade to high school, but also for whom school crime has increased or decreased since the base year. For example, were males more likely than females to experience an increase in threats of physical harm in high school compared to eighth grade?

Change measurement: achievement test data. In this report, gain in achievement is investigated in two ways. (1) Simple gain scores (the difference between a student's tenth and eighth grade score) are presented for reading, mathematics, science, and social studies. (2) For math, however, change in tested achievement is also reported in terms of gains in probability of proficiency. In mathematics, reading, and science, NELS:88 test items provide markers of multiple criterion-referenced points in the generalized growth curve. These criterion-referenced points, or proficiency levels, provide additional interpretive information. For example, two students may have the same simple gain scores, but be gaining at different points along the test score scale (that is, they are at different points along the growth curve). If a certain school process--say enrollment in advanced mathematics courses--can be expected to be related

to test score changes at specific points along the scale (say higher order problem solving skills), use of the proficiency level data will provide a better measure of the impact of school process on student growth than would changes in the overall test score. Further information about change measurement using NELS:88 test scores appears in Appendix B of this report.

Substantive Focus. In keeping with the title of this report, one of the issues investigated here is "school transitions of NELS:88 eighth graders." Because the term "transition" means many things, it is important to specify its meaning. Throughout this report, transition means simply school-related change, school-related cognitive growth, and family change. It does not mean the greater developmental transition that 1988 eighth graders were also experiencing during this time. It is true that between the ages of 13 and 15--the modal ages of the NELS:88 eighth grade cohort in 1988 and 1990--students are experiencing a developmental transition. A developmental transition is a period of life marked by considerable individual physical and environmental change (Peterson, 1988). It is the environmental aspect of change that NELS:88 elucidates particularly well. That is, NELS:88 investigates well the environmental changes students experienced during this greater developmental transition.

One of the most important school-based transitions described in this report is the status change from student to dropout. Dropping out can be defined in a number of different ways. In this report, the "cohort" definition of dropping out is used to describe who drops out and why students drop out. The cohort definition means that at any particular time, for example, spring of 1990, a certain percentage of a particular cohort, such as the eighth grade cohort of 1988, was not enrolled in school. Specifically, in the first follow-up, a dropout was defined as someone who, at the time of the first follow-up data collection period

- According to the school, or according to the school and home, was not attending school (that is, had not been in school for four consecutive weeks or more and was not absent due to accident or illness), or
- Was enrolled, but had been in school less than two weeks after a period in which he/she was classified as a dropout. (This group of recent returnees or stopouts was administered the dropout questionnaire; all other in-school returnees or stopouts were administered the student questionnaire.)

Moreover, the first follow-up counted as "in-school" any sample member who was receiving academic instruction, whether in a school (which grants a diploma), at home, in an alternative program, or in an institutional setting (e.g., jail). This definition of "in-school" applied to GED instruction and completion as well, though some sample members receiving GED instruction or who had completed their GED[4] identified themselves as school dropouts and were administered a dropout questionnaire. All individuals who completed a first follow-up dropout questionnaire are defined as dropouts for purposes of the analyses in this report.

[4] Some 2.4 percent of the dropouts claimed to already have a GED. Only 4.1 percent claimed that they did not intend to obtain a diploma or equivalency certificate, while 93.5 percent plan to go back to school for a diploma, enroll in (or are enrolled in) an alternative school or GED program, or otherwise plan to obtain a diploma or GED. See McMillen, M., Kaufman, P., Hauskn, E., and Bradby, D. 1993, *Dropout Rates in the United States: 1992*, NCES 93-464, for breakdowns of these statistics by race, and for standard errors for these estimates.

The ways in which the NELS:88 first follow-up's "cohort" definition of dropping out differs from other widely used definitions of dropping out, such as an "event" definition, are delineated further in Technical Appendix B of this report.[5]

Organization of This Report

The school, familial, and cognitive changes experienced by the NELS:88 eighth grade cohort in the two-year period are presented in three chapters.

Chapter 2 examines what may be, perhaps, the most dramatic school change youth may experience during this time, **the transition from student to dropout**.

Chapter 3, focuses on those members of the eighth grade cohort who remained in school, and primarily investigates the **normative transition from eighth grade school to another for high school**. This transition is investigated in two ways. First, the pattern of students' movement between public and private schools is examined (also between different types of private schools). Second, the ways in which students' learning environments may have changed (for students who changed to a new school for high school) is described. For whom these changes have occurred is also examined.

Because family plays a major role in student learning, academic achievement, and overall development, chapter 3 also summarizes the **family changes** all members of the eighth grade cohort experienced over the two year period.

Chapter 4 examines **student cognitive growth** between eighth grade and high school. NELS:88 is the first large-scale nationally representative longitudinal sample that attempts to assess student cognitive growth over this critical developmental period.

Chapter 5 draws together the findings reported in Chapters 2 through 4.

Appendices provide technical notes, full references for text citations, and tables of standard errors of measurement and sample sizes for all reported population estimates, as well as an overview of NELS:88.

- The **References** section supplies a bibliography of sources cited in this report.
- **Appendix A** supplies tables of standard errors, and sample sizes.
- **Appendix B** comprises methodological and technical notes on NELS:88 sample design, precision of estimates, statistical procedures, analysis procedures, and variables employed in analyses.
- **Appendix C** provides an outline of the NELS:88 research design and a brief history of the study components and their place in the NCES National Longitudinal Studies program.
- **Appendix D** contains an annotated bibliography of NELS:88 related publications.

Comparisons cited in this report have been tested for statistical significance using Bonferroni adjustments for two-tailed tests and are significant at the .05 level. (The overall alpha is adjusted, based on the number of possible comparisons; see Appendix B for a discussion of procedures used.) The

[5] Also see Barro & Kolstad, 1987; Ingels, Scott, Lindmark, Frankel, Myers & Wu, 1992; and McMillen, Kaufman, Hausken & Bradby, 1993; for descriptions of the various ways the phenomenon of school dropout may be defined and conceptualized.

estimates presented in this report are based on the privileged-use data files; these differ slightly from the public-use files. To ensure full confidentiality protection for all survey respondents, procedures commonly applied to protect individual respondent identities from disclosure--including suppressing, abridging, and recoding information that might pose a disclosure risk--were used in preparing the public-use data files.[6]

The NELS:88 1988 Eighth Grade Longitudinal Cohort: Background Characteristics

Before examining in detail the school and family changes NELS:88 eighth graders underwent in the two years between the base year (1988) and first follow-up (1990) surveys, it may be useful to review some of their basic background characteristics, as displayed in Table 1. Many of the same characteristics presented in Table 1 are used in other tables throughout this report as classification or independent variables. However, unlike Table 1, the other tables presented in this report present characteristics of either cohort members who dropped out of school or who remained in school, and not on the characteristics of the eighth grade class of 1988 as a whole.

In simple terms, the eighth grade longitudinal cohort in 1990 is the eighth grade class of 1988 two years later. They represent the population of approximately three million adolescents who were enrolled in eighth grade in 1988. As shown in Table 1, as in the base year, half the cohort in 1990 was male and half was female. Nine out of ten (90%) cohort members enrolled in school as of the spring of 1990 attended a public school. Two years after eighth grade, close to two-thirds (63%) of NELS:88 eighth graders were 16 years of age or younger (born in 1974 or after), whereas a third (31%) were 17 at the beginning of 1990 (born in 1973) and about one out of sixteen (6%) was at least 18 years old at the beginning of 1990 (born in 1972 or before).

The racial/ethnic composition of the cohort is diverse: about 4 percent were Asian, 10 percent were Hispanic, 13 percent were black, 72 percent were white, and just 1 percent was of American Indian background. The composition of their families as of 1988 was also quite varied: while the majority (64%) of 1988 eighth graders came from a two-parent "mother and father" family, 15 percent came from a two-parent family identified as mother and male guardian (12.0%) or father and female guardian (2.8%), 15 percent lived with their mother only, 3 percent lived with their father only, and 3 percent lived with another relative (someone other than their mother and/or father) or non-relative, such as a girlfriend or boyfriend. With parents' education defined as the highest academic degree of either parent (or guardian), more than half (55%) of cohort members' parents had either completed college or received some college education, and an eighth (13%) had received an advanced degree; however, close to a third (32%) had at most a high school diploma or its equivalent.

One characteristic that had changed since the base year was school enrollment status. Unlike the base year, the eighth grade cohort two years later was composed of both students and dropouts. As of the spring of 1990, 89 percent of the eighth grade cohort was enrolled in tenth grade, close to 5 percent was enrolled in a grade other than tenth (either held back or promoted ahead of their class), and 6 percent had dropped out.[7]

This latter change--from student to dropout--is investigated first, in the next chapter.

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[6] For details on deleted, abridged or recoded variables in the public release files see the First Follow-Up Student Component Data File User's Manual (Ingels, Scott, Lindmark, Frankel, Myers, & Wu, 1992).

[7] Of the 5 percent of eighth grade cohort members who had fallen out of modal grade progression, measures were not taken for separately reporting who had been held back and who had been promoted.

Table 1 Selected background characteristics of the eighth grade class of 1988 in 1990

TOTAL	100.0%
Gender	
Male	50.2
Female	49.8
Race/Ethnicity	
Asian	3.5
Hispanic	10.4
Black	13.3
White	71.5
American Indian	1.3
Family Composition in 1988	
Mother & father	64.0
Mother & male guardian	12.0
Father & female guardian	2.8
Mother only	15.3
Father only	2.7
Other relative/non-relative	3.4
Year of Birth	
1972 or before	5.5
1973	31.4
1974 or after	63.1
Parent's Education as of 1988	
Less than HS	10.6
HS graduate	20.9
Some college	41.4
College graduate	14.0
Advanced degree	13.1
School Type as of 1988	
Public	90.1
Catholic	6.1
Independent (NAIS)	1.2
Other private	2.7
1990 School Enrollment Status	
Enrolled in tenth grade	89.0
Enrolled in a grade other than tenth	4.6
Dropout	6.0

NOTE: Owing to rounding, some subcategories may not sum to 100 percent. If a two-parent family or guardianship family, parent education characterizes highest education attained by either parent or guardian. Some college means less than one year to two or more years of vocational, trade, or business school after high school; completion of a two year college program or some years of college without completing a four- or five-year program. College graduate means finished a four- or five-year program only.

SOURCE: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Chapter 2: The Transition from Student to Dropout: Early-Grade Dropouts

No account of the 1988 eighth grade cohort would be complete without reporting on those eighth graders who were not in school two years later. This chapter describes the characteristics of this group.

The decision to drop out of school has dramatic social and economic consequences for both the individual and society at large. Statistics comparing the average monthly income of dropouts to high school graduates and adults with education beyond high school[1] illuminate the economic consequences of dropping out of school. As of 1990, the average monthly earnings of adults who dropped out of school were $492 per month, compared to $1,077 per month for adults who held a high school degree and $2,231 per month for adults who held a degree beyond high school (*What's It Worth? Educational Background and Economic Status: Spring 1990*, U.S. Bureau of the Census, 1992).

Society suffers as well when individuals drop out of school. Dropouts are more likely to be unemployed; and, fewer individuals in the labor pool means reductions in local, state, and federal revenue, as well as increases in local, state, and federal expenditures for assistance programs, such as job training, and family and individual support (Levin, 1972; McCaul, Donaldson, Coladarci & Davis, 1992; Natriello, Pallas & McDill, 1987; Steinberg, Blinde & Chan, 1984).

Given the consequences of dropping of school, it was encouraging to find in 1988 very few eighth graders who expected to not complete high school. Indeed, some 99 percent of 1988 eighth graders expected to graduate from high school. Two years later, however, 6 percent of 1988 eighth graders, representing 183,477 adolescents nationwide, were not enrolled in school.[2] Who are these members of the eighth grade class of 1988, and why did they decide to leave school early? These questions are examined in this chapter.[3]

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[1] Education beyond high school includes some college but no degree, vocational training, associate's degree, 4 year college degree, and advanced degree.

[2] Because students with severe mental, physical, or linguistic barriers to participation were excluded from base year participation, this estimate is an underestimate of the eighth grade to tenth grade dropout rate. A corrected rate, taking into account the enrollment status of the excluded as well as included students is 6.8 percent. Cohort dropout rates that took NELS:88-ineligible eighth graders into account--including breakdowns by race, sex, base year school type, urbanicity and region--are reported in Kaufman, McMillen, & Whitener, 1991, NCES 91-053, Table 8. Not all patterns of results reported in this chapter with the NELS:88-eligible eighth-grade cohort hold for the NELS:88 cohort that includes both eligible and ineligible members. The NELS:88-eligible cohort was used in this report because it is the only cohort for whom questionnaire data are available. Base year questionnaire data were not collected from ineligible members of the eighth-grade cohort and first follow-up questionnaire data were collected from ineligible cohort members only if they subsequently became eligible to participate in the study. For more information on ineligible members of the NELS:88 eighth-grade cohort see Ingels (1995).

[3] It is important to note that even though 6 percent of the 1988 eighth grade cohort had dropped out of school by the spring semester of the 1989-1990 academic school year, eighth graders' school completion expectations may not have changed since 1988. Rather, some cohort members may be pursuing an alternative route to or pace of completion. Less than five percent of NELS:88 first follow-up dropouts believe that they will not eventually finish high school or obtain an equivalency certificate. Findings from follow-up surveys of HS&B 1982 dropouts show that close to half had either completed high school or, more typically, had received a GED, by 1986.

Specifically, this chapter investigates the phenomenon of early-grade dropout[4] in a variety of ways. This chapter:

- Examines the characteristics of early-grade dropouts,
- Profiles early-grade dropouts in relation to their eighth grade classmates who remained in school,
- Inquires into their reports of why they leave school, and
- Compares early-grade dropouts to other at-risk students.

Who Drops Out of School Between Eighth and Tenth Grade?

Though the education literature is replete with studies on the characteristics of dropouts, little nationally representative data are available on the characteristics of **early-grade dropouts** (that is, eighth graders who drop out prior to the completion of the sophomore year of high school). NELS:88 was designed to assess the magnitude, scope, and dynamics of the phenomenon of early-grade dropout. While some researchers question the utility of the study of individual characteristics because it delineates immutable rather than manipulable features of the dropout situation (Fine, 1987; Wehlage & Rutter, 1987), such data are important for at least two reasons. First, such descriptive information enables educators and policymakers to monitor potential shifts in the dropout population, and thus tailor intervention programs to meet the needs of the changing population. Second, examining the characteristics of 1990 early-grade dropouts tests the generalizability of previous findings on dropouts, some of which (for example, HS&B) are drawn from samples including only post-sophomore year dropouts.

In a review of the literature on dropping out, Ekstrom, Goertz, Pollack and Rock (1987) found the following five characteristics to be consistently and strongly associated with school-leaving: low socioeconomic status (SES), black or Hispanic race/ethnicity, single parent family composition, low test scores, and high absenteeism. Table 2.1 depicts NELS:88 1988-1990 dropout rates in relation to these five characteristics and a few more.

[4] In this report, the term "early-grade dropout" refers to eighth graders who were out of school two years later, hence dropped out at the end of eighth grade or during ninth or tenth grade. The term "late-grade dropout" refers to sophomores who were out of school (and had not completed school) two years later, i.e., students who dropped out at the end of tenth grade or during eleventh or twelfth grade. Both terms, "early" and "late" grade dropouts use a "cohort" definition of dropping out, meaning that as of a particular time, for example, spring of 1990, a certain percentage of the 1988 eighth grade cohort, was not enrolled in school. The *cohort status* definition used in this report is not the same as an *event* definition of a dropout. The latter definition encompasses any member of a particular cohort who ever dropped out, even students who subsequently returned to school. (For more information on how dropouts were defined in the NELS:88 first follow-up see Appendix B).

Table 2.1 Percentage of 1988 eighth graders who dropped out of school by spring of 1990 by selected background characteristics

	Percent Dropping Out
Total	6.0%
Sex	
Male	6.3
Female	5.8
Race/Ethnicity	
Asian	3.1
Hispanic	9.2
Black	10.0
White	4.9
American Indian	10.3
Base Year SES Quartile	
Lowest	14.8
Second Lowest	4.7
Second Highest	3.7
Highest	1.7
Base Year Test Quartile	
Lowest	13.2
Second Lowest	6.8
Second Highest	3.0
Highest	0.5
Base Year Family Composition	
Mother & Father	3.3
Mother & Male Guardian	10.1
Father & Female Guardian	5.4
Mother only	9.5
Father only	7.6
Other Adult	23.0

SOURCE: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Table 2.1 **Percentage of 1988 eighth graders who dropped out of school by spring of 1990 by selected background characteristics (cont'd)**

	Percent Dropping Out
Base Year Parent's Education	
Less than HS	20.2
HS Graduate	5.9
Some College	4.8
College Graduate	1.3
Advanced Degree	2.9
Year of Birth (age at time of first follow-up)	
1972 or before (17-18 years old or older)	33.6
1973 (16-17 years old)	9.9
1974 or after (15-16 years old or younger)	1.6
Ever Repeated a Grade	
Yes	18.4
No	2.5
Days Absent From School	
0	3.1
1-4 days	1.6
5-15 days	7.8
16 + days	32.7
As of 1990, Expecting or Have a Baby (females only)	
Yes or expecting	49.1
No	4.6

NOTE: In this analysis of the relationship of absenteeism and dropping out, students' first follow-up reports of the number of days they were absent from school in a given time period were used. 1988 eighth graders completing a first follow-up student questionnaire were asked to report the number of days they were absent during the first semester of the 1989-1990 academic school year while cohort members completing a dropout questionnaire were asked to report the number of days they were absent during the last semester they attended school. Cohort members completing the student questionnaire could have been either in tenth grade or some other grade, suggesting that they were held back or promoted. Conceptually, high absenteeism may be viewed as a factor occurring concomitantly with dropping out, as much as a precipitate of school-leaving.

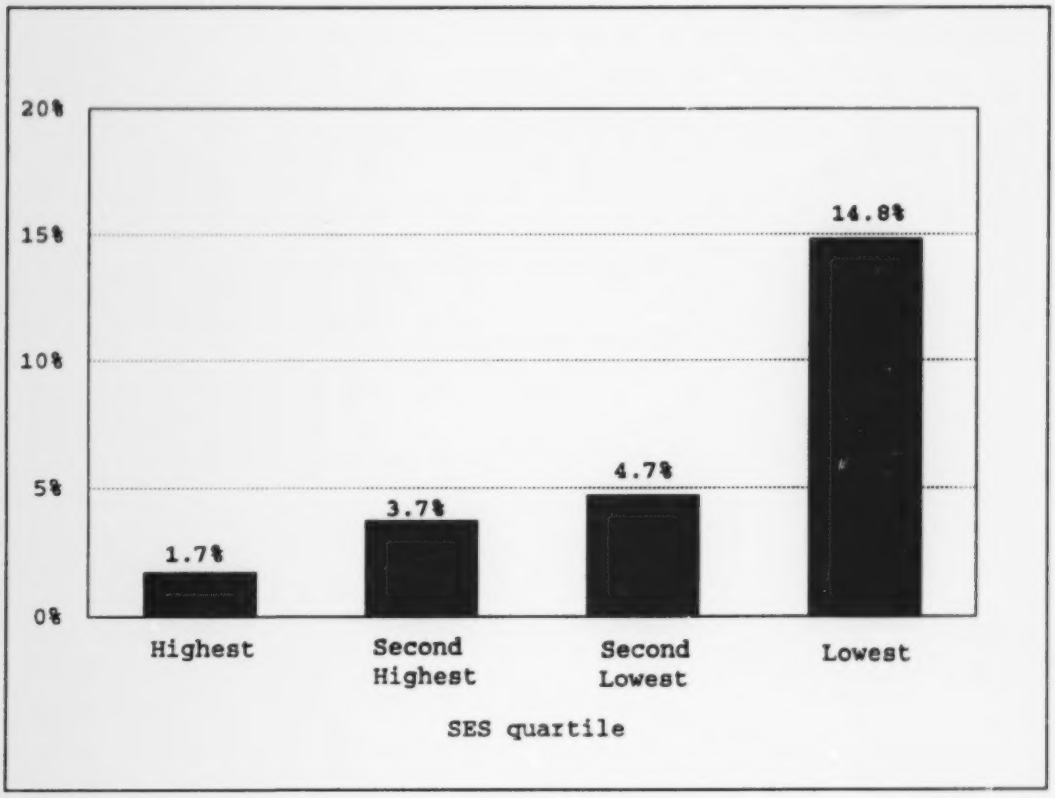
If a two-parent family or two-parent guardian family, parent education characterizes the highest education attained by either parent or either guardian.

SOURCE: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Sex. While males appear to have dropped out at a slightly higher rate, the difference between male and female dropout rates is not statistically significant.[5]

Socioeconomic status (SES). Consistent with the research literature on dropouts, SES is also negatively related to the likelihood of leaving school early. As shown in Figure 2.1 (and in Table 2.1), 1988 eighth graders in the lowest SES quartile were nine times (15%) more likely than students in the highest SES quartile (2%) and three to four times more likely than students in the middle two quartiles (second lowest, 5%; second highest, 4%) to drop out of school early. The dramatic increase in the rate of dropping out for students of low SES compared to students from the other SES quartiles, suggests again how academically at risk students with few financial resources are compared to students with even moderate financial support.

Figure 2.1 Percentage of 1988 eighth graders who were dropouts in 1990 by SES quartile



SOURCE: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

[5] The NELS:88 first follow-up finding that males and females are equally likely to drop out of school holds also for the NELS:88 first follow-up expanded sample (eligible eighth graders + ineligible eighth graders). That is, while it is true that more male than female eighth graders were found to be ineligible in the base year, even when the dropout rate is calculated for the expanded sample, the difference between males (7.2%) and females (6.5%) remains statistically nonsignificant. (See Kaufman, McMillen, and Whitener, 1991, for NELS:88 first follow-up expanded sample dropout statistics.)

Race/ethnicity. Race/ethnicity dropout rates presented in Table 2.1 show that Hispanic youth were nearly twice as likely as white students (9% versus 5%) and three times more likely than Asian students (9% versus 3%) to leave school early. Similarly, blacks were also three times more likely than Asian students (10% versus 3%) to leave school early. However, the dropout rates for black students (10%) did not differ significantly from the dropout rate for white students (5%). And, while the dropout rate for American Indians was as high as that for blacks and Hispanics, American Indians were not found to differ significantly from whites, presumably due to the small sample size of American Indians in the study.

Though non-Asian minority students have been consistently found, and reported in the literature, to be considerably more likely than white students to drop out of school (Steinberg, Blinde & Chan, 1984), individuals' SES should also be taken into account in order to understand the relationship between race/ethnicity and school dropout. One of the major challenges facing researchers studying minority youth is the confounding of race/ethnicity with social class (Spencer & Dornbusch, 1992). When factors are confounded, it is difficult to conclude which of several highly correlated factors are most salient to the phenomenon under study. SES is highly correlated with race/ethnicity: minorities are disproportionately represented in the lowest SES quartile. Thus, to assess whether racial/ethnic group membership or SES (or a combination of both) is related to the decision to leave school early, race/ethnicity was examined again, controlling for SES. The results of this analysis are reported in Table 2.2.

Within SES quartiles, there are few significant differences in dropout rates among racial/ethnic subgroups. Within the lowest SES quartile, low-SES whites (17%), like low-SES Hispanics (14%), were almost three times more likely than low-SES Asians (5%) to leave school early.

Table 2.2 Percentages of 1988 eighth graders who dropped out of school by spring of 1990 by race/ethnicity controlling for SES.

Race/Ethnicity	Lowest SES Quartile	Second Lowest	Second Highest	Highest SES Quartile
Total	14.7	4.6	3.7	1.7
Asian	4.8	8.2	1.7	low n
Hispanic	14.3	4.7	4.5	1.3
Black	11.5	5.0	10.2	16.5
White	16.6	4.4	2.7	.7
American Indian	19.4	9.8	2.5	2.0

SOURCE: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

The nominally higher dropout rates (within the lowest quartile) for Hispanics compared to blacks (14% compared to 12%, respectively) and whites (17%) compared to blacks were not statistically significant. Low SES blacks with a 12 percent dropout rate were no more likely to drop out of school than Asians with a 5 percent dropout rate. This negation of the previous finding is most likely due to the small sample size of Asians within the lowest SES quartile. These findings are consistent with previous

findings. Once SES is taken into account, racial/ethnic differences among non-Asian subgroups disappear (Barro & Kolstad, 1983; McMillen, Kaufman, Hausken & Bradby, 1992; Rumberger, 1983). This finding holds across all quartiles of SES, even the two highest SES quartiles in which blacks *appear* to be dropping out of school at a rate substantially higher than that of other racial/ethnic subgroups.

Family composition. Family composition has long been associated with the likelihood of dropping out (Ekstrom, Goertz, Pollack & Rock, 1989; Rumberger, 1987). It is not unexpected, therefore, to find a similar association between these two factors for the NELS:88 eighth grade cohort. The impact of family composition is difficult to interpret, however, without sophisticated controls for the impact of other factors, such as SES.

Statistical analysis of the data reveals, that NELS:88 eighth graders who came from two-parent, "mother and father" families, "father and female guardian" families, and "father only" families were less likely than classmates who came from "other adult" families to have dropped out of school two years later. Students from father and female guardian families were also less likely than students from mother and male guardian families to drop out. NELS:88 eighth graders who came from single-parent families and two-parent, mother and male guardian families were found to be at greater risk of dropping out of school than two-parent, mother and father families.

Again, family structure and socioeconomic status are complexly intertwined, and unequivocal interpretation of the relationship between school dropout and family structure requires models that fully accommodate such interdependencies. Intriguing though the associations between family composition and school dropout may be, analyses which take into account a number of other factors that covary with particular types of familial compositions must be performed before firm conclusions are drawn. For example, single-parent families are more likely than two-parent families to be poor and less involved in their children's education (Astone & McLanahan, 1991; Garfinkel & McLanahan, 1986; Rumberger, Ghatak, Poulos, Ritter & Dornbusch, 1990). Thus, it is possible that factors associated with certain family structures--such as limited financial and educational support--are more important contributors to school dropout than the composition of the family per se.[6]

Standardized achievement test scores. Poor school performance, as measured by standardized achievement tests or coursework grades, has been found consistently to be related to school dropout; these findings are replicated here among early-grade dropouts. The dropout rate among 1988 eighth graders who scored in the lowest quartile on the base year cognitive test was 26 times (13%) greater than the incidence of dropping out of school for students within the highest test quartile (0.5%). Viewed another way, the drop out rate for lowest test quartile students (13%) was more than twice the national average (6%) for 1988 eighth graders overall.

[6] The literature on the effects of single-parent families on educational outcomes contains equivocal findings and underscores the need to be cautious in interpretation. Grissmer et al. (1994, p. 66), analyzing patterns of academic achievement in NELS:88 and NLSY, "find an insignificant effect for single parents in both datasets" when other factors are taken into account. Finn and Owings (1994) compared academic performance in eighth graders from natural-parent families and single-parent families and parent-stepparent families using NELS:88 data. They found that the effects of alternative family structures were strong and consistent but reduced or eliminated for single-mother families when controlling for race and socioeconomic status. To draw strong conclusions about the effects of single-parent families on persistence in school, academic achievement, or other educational outcomes, requires that other critical variables, such as income, family size, parental education and the like, be taken into account.

Age and grade retention. Most students who are substantially older than the majority of their classmates have been retained one or more grades. Because of this relationship, it is important to discuss the association of both age and grade retention to the likelihood of dropping out together.

As shown in Table 2.1, both over-age status and grade retention (which can also be an indicator of poor academic performance) were highly associated with dropping out. The older an individual is (relative to the modal age of classmates), the more likely he/she was to drop out of school. Cohort members who were just one year older (16-17 years old) than the modal age of their classmates in 1990 (15-16 years old) were five times (10%) more likely to drop out of school than cohort members who were the same age as the modal age of their classmates (2%). The likelihood of dropping out more than tripled for cohort members who were two or more years older (17-18 years old) than the majority of their classmates: two years older or older cohort members were 17 times (34%) more likely to drop out of school than modal-age cohort members (2%).

The incidence of dropping out for cohort members who repeated a grade was 18 percent compared to 3 percent for non-repeaters. Put another way, repeaters were seven times more likely to drop out of school than non-repeaters.

Days absent from school. Truancy and absenteeism have also been found to be highly related to school dropout (Ekstrom et al., 1987). The NELS:88 data on early-grade dropouts support this finding. Indeed, the dropout rate for students who reported that they were absent 16 or more days during the first semester of the 1989-1990 academic school year (or, for dropouts, during the last semester they attended school) was 33 percent compared to the rates of 3 percent for students who were not absent at all, 2 percent for students who were absent one to four days and 8 percent for students who were absent 5 to 15 days. Although not as dramatic as the difference in dropout rates between students in the lowest and highest test quartiles, students who reported that they had missed 16 or more days during the first semester of the 1989-1990 academic year (or last semester they attended school) were more than 10 times as likely to drop out of school than students who were never absent during this same time period.

Having or expecting a child. Several studies have found a strong relationship between adolescent child-bearing and school dropout (Barro & Kolstad, 1987; Howell & Frese, 1982; Marini, 1978; Waite & Moore, 1978). However, it is less certain whether early child-bearing affects the likelihood of a female's *eventually* completing school, at least, if GED completion is regarded as the equivalent of high school graduation (Olsen & Farkas, 1988; Upchurch & McCarthy, 1990). NELS:88 data confirm the association of pregnancy and childbirth with school dropout. For NELS:88 females who reported either having or expecting a child, the dropout rate was 49 percent, compared to 5 percent for females who reported not having or expecting a child. In fact, for all NELS:88 early-grade female dropouts, more than a quarter (29%) reported they either expected or had a child (see Table 2.3). This does not mean that pregnancy necessarily is the *cause* of students leaving school[7]--such outcomes as pregnancy, childbirth, poor academic performance, and school dropout may be interrelated manifestations of the same situational and personal causal factors.

[7] Causal inferences cannot be drawn from simple bivariate analysis or tests of association; multivariate analysis, employing multiple independent and dependent variables, constitutes a more appropriate vehicle for investigating causation. As Barro and Kolstad (1987) cautioned in their extensive examination of HS&B dropouts, pregnancy and childbirth are "endogenous variables, likely to be influenced by many of the same personal and environmental characteristics as affect educational outcomes, including dropping out."

Students and Dropouts Contrasted

While the dropout rates reported in Table 2.1 inform us of the characteristics that are associated with school dropout, they do not show how eighth grade cohort students and dropouts differed from each other. Another approach to describing the characteristics of early-grade dropouts is to directly compare them to their eighth grade classmates who remained in school two years later. A comparison of the characteristics of 1988 eighth graders who remained in school and who dropped out of school by 1990, is presented in Table 2.3.

As shown in Table 2.3, eighth grade cohort dropouts are more likely than their classmates who remained in school to be Hispanic, black, older and from non-traditional families (specifically, mother-only, mother-and-male guardian, and other-adult families) and low-SES families. They are not more likely to be of one particular gender.

Race/ethnicity. Eighth graders who were out of school two years later were disproportionately Hispanic or black.[8] While 13 percent of the in-school 1988 eighth graders were black, 22 percent of the out-of-school eighth graders were black. Likewise, while 10 percent of the 1988 eighth grade students (in 1990) were Hispanic, 16 percent of 1988 eighth grade dropouts were Hispanic.

Socioeconomic status (SES). While cohort members who remained in school were fairly evenly represented across the four SES quartiles, with 21 percent of student persisters in the lowest SES quartile and 27 percent in the highest, eighth grade cohort dropouts were disproportionately represented within the lowest SES quartile. More than one half (58%) of NELS eighth grade dropouts come from low-SES backgrounds or families; only seven percent (compare to 27 percent for student persisters) come from high-SES families.

Standardized achievement test scores. The distribution of students and dropouts across the four levels of tested achievement mirrors the distribution for these two groups across levels of socioeconomic status (SES) reported above. Again, students are fairly evenly distributed across the four quartiles of tested achievement, with 22 percent of students in the lowest test quartile and 27 percent of students in the highest test quartile. Dropouts, however, are disproportionately represented in the lowest test quartile with more than one half (56%) achieving a low-quartile test score on the base year achievement tests; only 2 percent of dropouts achieved a high-quartile test score.

Family composition. Comparing the family compositions of students and dropouts, dropouts are disproportionately from mother-and-male guardian, mother-only, and other-adult families. As shown in Table 2.3, the 30 percentage point difference between the percentage of students (66%) and the percentage of dropouts (36%) who live with their mother and father, for dropouts, is accounted for by the three alternative family compositions of mother-and-male guardian, mother-only, and other-adult families: 21 percent of eighth-grade cohort dropouts live with a mother and male guardian compared to 11 percent of eighth-grade cohort students; 25 percent of dropouts live with their mother only compared to 15 percent

[8] Socioeconomic status was not controlled for in this profile of dropouts. The independent effect of black/Hispanic race/ethnicity status is uncertain owing to its collinearity with low SES. When SES is taken into account (see Owings & Peng, 1992, for an explanation of race/ethnicity differences of dropouts in the lowest SES quartile), blacks and Hispanics no longer show a higher NELS:88 dropout rate than whites,a result that conforms to HS&B findings (Barro and Kolstad, 1987). NLSY and HS&B dropout analyses showed also that controlling for academic achievement eliminated or reversed race/ethnicity differences in dropping out (see, for example, Griffith, Frase and Ralph, 1989).

of students; and 13 percent of NELS dropouts live with an other adult, such as a relative, friend, boyfriend or girlfriend, compared to 3 percent of NELS students.

Parental education. Eighth-grade cohort dropouts are also more likely than their classmates who remained in school to have parents who have less than a high school education. More than a third (36%) of dropouts' parents did not complete high school, whereas 9 percent of students still in school had parents who did complete high school.

Age. Close to one third (31%) of eighth-grade cohort dropouts are two years older than most (66%) 1988 eighth grade students. Thirty-one percent of 1988 eighth grade dropouts were born in 1972 or before, whereas 66 percent of 1988 eighth-grade students were born in 1974 or after.

Grade repetition. Related to age and school dropout is the act of repeating a grade. Almost two out of three (61%) 1988 eighth graders who were out of school two years later have repeated at least one grade. Among their classmates who remained in school, about one out of seven (15%) have repeated a grade.

Days absent from school. In terms of the number of days students and dropouts were absent from school, students were more likely than dropouts to be absent 1 to 4 days during a semester, whereas dropouts were more likely than students to be absent 16 or more days. It is important to note, that similar to simple crosstab tables, such as Table 2.2, which present results in terms of possible associations between various independent variables and outcomes, inferences as to whether a particular independent variable is causally related to a particular outcome cannot be derived solely from comparing students to dropouts, such as in Table 2.3. High absenteeism, similar to the next characteristic to be discussed, having or expecting a child, may be viewed as a factor occurring concomitantly with dropping out of school, as much as a precipitate of school-leaving.

Having or expecting a child. Among NELS:88 female dropouts, more than a quarter (29%) reported they either had or were expecting a child; among NELS:88 female students, 3 percent either had or were expecting a child.

Examined next are 1988 eighth graders' reports of <u>why</u> they dropped out of school.

Table 2.3 **Percentage of 1988 eighth graders who had dropped out of school by spring of 1990 versus remained in school, by selected background characteristics**

	Student	Dropout
Total	100.0%	100.0%
Sex		
Male	50.1	52.0
Female	49.9	48.0
Race/Ethnicity		
Asian	3.6	1.7
Hispanic	10.1	15.9
Black	12.8	22.1
White	72.4	58.1
American Indian	1.2	2.3
Base Year SES Quartile		
Lowest	21.4	57.8
Second Lowest	25.6	19.5
Second Highest	26.2	15.7
Highest	26.9	7.0
Base Year Test Quartile		
Lowest	22.2	56.2
Second Lowest	23.3	28.0
Second Highest	27.1	13.7
Highest	27.4	2.1
Base Year Family Composition		
Mother & Father	65.8	35.6
Mother & Male Guardian	11.4	20.6
Father & Female Guardian	2.8	2.5
Mother Only	14.7	24.7
Father Only	2.6	3.4
Other Adult	2.7	13.1

NOTE: Due to rounding, numbers may not sum to 100 percent.

SOURCE: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Table 2.3 **Percentage of 1988 eighth graders who had dropped out of school by spring of 1990 versus remained in school, by selected background characteristics (cont'd)**

	Student	Dropout
Total	100.0%	100.0%
Base Year Parent's Education		
Less than HS	9.0	36.3
HS Graduate	20.9	20.8
Some College	41.9	33.3
College Graduate	14.7	3.2
Advance Degree	13.5	6.4
Year of Birth (age at time of first follow-up)		
1972 or before (17-18 or older)	3.9	31.0
1973 (16-17)	30.1	51.8
1974 or after (15-16 or younger)	66.0	17.2
Ever Repeated a Grade		
Yes	15.3	61.2
No	84.7	38.8
Days Absent From School		
0	14.3	7.2
1-4 days	50.7	12.8
5-15 days	29.9	39.9
16+ days	5.2	40.1
As of 1990, Expecting or Have a Baby (females only)		
Yes or expecting	2.5	28.5
No	97.5	71.5

NOTE: Due to rounding, numbers may not sum to 100.0 percent. Number of days absent from school is based on the first follow-up questionnaire item that asked participants "In the first half of the current school year, about how many days were you absent from school for any reason?" In this analysis of the relationship of absenteeism and dropping out, students' first follow-up reports of the number of days they were absent from school in a given time period were used. 1988 eighth graders completing a first follow-up student questionnaire were asked to report the number of days they were absent during the first semester of the 1989-1990 academic school year while cohort members completing a dropout questionnaire were asked to report the number of days they were absent during the last semester they attended school. Conceptually, high absenteeism may be viewed as a factor occurring concomitantly with dropping out, as much as a precipitate of school-leaving. If a two-parent family or two-parent guardian family, parent education characterizes the highest education attained by either parent or either guardian.

SOURCE: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Dropouts' Reports of Why They Left School

Sometimes the best way to find out why an individual did something is to ask them directly. The reasons dropouts report for leaving school serve as a point of entry into the study of the antecedents of school dropout. One of the first questions asked of all dropouts in the first follow-up was, "Why did you drop out of school?"

The first follow-up questionnaire item on student reasons for leaving school reads, "Here are some reasons other people have given for leaving school. Which of these would you say applied to you?" Dropouts could report as many of the 21 reasons listed as they wished. The 21 items primarily reflected three global reasons for leaving school: 1) school reasons (e.g., "I was failing school"), 2) economic reasons (e.g., "I had to support my family") and 3) family reasons (e.g., "I became the father/mother of a baby").

Table 2.4 lists dropouts' reasons for leaving school. Of the 21 reasons dropouts could select, only four were not reported by more than ten percent of the respondents. While it appears that dropouts leave school for a variety of reasons, seven of the ten most frequently cited reasons pertained to school problems and performance. The most frequently reported reason for leaving school, given by slightly more than one-half of all NELS:88 dropouts (51%), was "I did not like school." More than one-third recalled they had left school because they were failing (40%) and/or could not get along with their teachers (35%). And, just under one-third (31%) reported leaving school because they could not keep up with their school work. These responses suggest that, as was the case for older dropouts of a decade ago, most early dropouts leave school because they do not like it for a variety of reasons. Perhaps they fail to see the relevance of school or, as indicated by some of the other reasons reported, perhaps their dislike of school stems from poor academic performance and equally poor interactions with teachers and other students. Nonetheless, students' varied reasons for dropping out reflect the complexity of the dropout problem.

Students also leave school for economic and family reasons. Slightly more than one out of seven dropouts reported they left school because they had to get a job (15%) or they found a job (15%). Two of the more frequently cited reasons for leaving school among females were marriage and/or pregnancy (only asked of females). Slightly less than a quarter of female eighth grade cohort dropouts (24%) gave marriage as a reason for leaving school, while 31 percent reported they left school due to pregnancy.

Table 2.4 Reasons given for dropping out of school by sex

	Total	Males	Females
School Reasons			
I didn't like school	51.2	57.8	44.2
I was failing school	39.9	46.2	33.1
I couldn't get along with teachers	35.0	51.6	17.2
I couldn't keep up with my school work	31.4	37.6	24.7
I felt I didn't belong	23.2	31.5	14.4
I couldn't get along with other students	20.1	18.3	21.9
I was suspended too often	16.1	19.2	12.7
I was expelled from school	13.4	17.6	8.9
Changed schools and didn't like new one	13.2	10.8	15.8
I did not feel safe at school	12.1	11.5	12.8
Economic Reasons			
I had to get a job	15.3	14.7	16.0
I found a job	15.3	18.6	11.8
Couldn't work and go to school at same time	14.1	20.0	7.8
I had to support my family	9.2	4.8	14.0
Family Reasons			
I was pregnant (females only)	31.0	NA	31.0
I got married or planned to get married	13.1	3.4	23.6
I became a father/mother	13.6	5.1	22.6
I had to care for my family	8.3	4.6	12.2
I wanted to have a family	6.2	4.2	8.4
Personal Reasons			
My friends dropped out of school	14.1	16.8	11.3
I wanted to travel	2.1	2.6	1.7

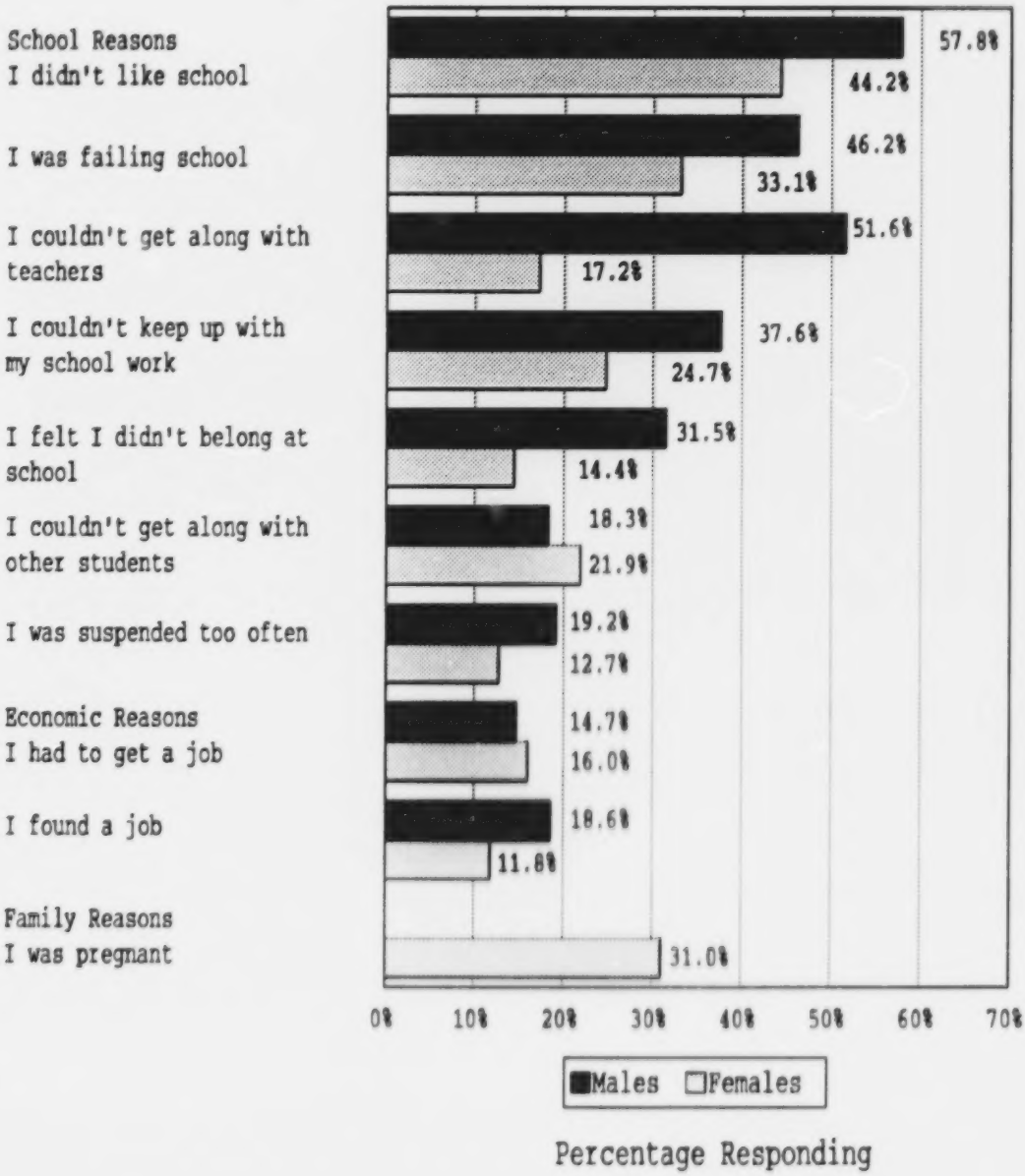
SOURCE: National Education Longitudinal Study of 1990: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Significant differences appear between male and female dropouts' reasons for leaving school. For males, eight out of the ten most frequently reported reasons concern performance in school, and the remaining two reasons concern finding a job. For females, six out of the ten most frequently reported reasons are school-related reasons, only one is economic-related (I had to get a job), and three are family-related. Three times more males (52%) than females (17%) reported they left school because they "couldn't get along with teachers." Males were also more likely than females to report "I felt I didn't belong;" twice as many males (32%) as females (14%) reported this reason. Females, on the other hand, were seven times more likely than males to state they left school to get married and four times more likely than males to report they left school because they became a parent.

The data in Table 2.4 and Figure 2.2 show that most eighth grade cohort dropouts reported that they left school for school-related reasons. Nevertheless, many female dropouts also left school to have a family, get married or take care of their family. After school-related reasons, males most often left school due to economic concerns.

In the next section we examine the predictive utility of "at-risk" indicators.

Figure 2.2 **Percentage of dropouts reporting they left school for the following reasons by sex (ten most frequent reported reasons)**



SOURCE: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

The Predictive Utility of "At-Risk" Indicators

In the NELS:88 base year descriptive report (Hafner, Ingels, Schneider & Stevenson, 1990) several measures of students at risk of dropping out were employed, and students were classified, based on a combination of six indicators, as "students not at risk of school failure" (students who did not possess an at-risk indicator), "low risk students" (students who possessed one at-risk indicator) and "high risk students" (students who possessed two or more risk factors). The risk factors employed were single-parent family, low parent education, limited English proficiency, low family income, sibling that dropped out of school, and home alone for more than 3 hours on weekdays. For this report, we returned to these base year classifications to gain some sense of how well such risk indicators predict school dropout. Table 2.5 shows the percentage of cohort members who remained in school and dropped out by number of at-risk factors, indicated by "no", "one", or "two or more.

As the percentages in Table 2.5 show, the factors used to represent students at risk of dropping out were highly associated with actual school dropout. The incidence of dropping out of school was nearly eight times (15%) higher for high at-risk cohort members, or members with two or more risk factors, than it was for cohort members with no risk factors (2%). That is, the incidence of dropping out for students with two or more risk factors is two and a half times (15%) higher than the national average for the 1988 eighth graders. (The national average is 6 percent.) Likewise, although not as large, the incidence of dropping out for students with one at-risk factor was significantly greater (almost 3 times higher) than for students with no at-risk factors.[9]

Table 2.5 Percentages of 1988 eighth graders who dropped out of school by "0", "1", or "2 or more" "at-risk" factors

	Number of At-Risk Factors			
	Total	0	1	2 or more
Dropout	6.0	1.8	5.0	15.2
Student	93.9	98.2	95.0	84.8

NOTE: Due to rounding, numbers may not sum to 100.0 percent.

SOURCE: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

[9] For an extension of this at-risk analysis to the 1992 NELS:88 data, see Green and Scott, 1995.

Chapter Summary

Clearly, in the two year period between eighth and tenth grade, students experience considerable change with dramatic academic, social, and economic consequences. Perhaps the most dramatic of these notable changes, is the change from student to dropout, a change experienced by 6 percent of 1988 eighth graders. This chapter examined student dropout in terms of who and why students left school. To summarize the major findings

Who drops out

Early-grade dropouts, that is, students who drop out of school some time between eighth and tenth grade, tend to conform to the profile of students who drop out in later grades, that is, who drop out some time between tenth and twelfth grade (Ekstrom, Goertz, Pollack & Rock, 1987). NELS:88 early-grade dropouts were more likely than their eighth grade classmates, as shown in Table 2.3, to be

- From a low-SES family,
- From a family in which the highest level of parental education is less than high school,
- Hispanic or black,
- Grade repeaters,
- Older,
- A member of a family with a structure other than mother and father.

Why students drop out of school early

Most students--both males and females--said that they leave school because, for a number of different reasons, they do not like it. Overall, 51 percent of NELS:88 dropouts reported "I didn't like school" as one reason for leaving. Fifty-eight percent of male dropouts and 44 percent of female dropouts gave this reason.

- Although males and females were equally likely to report that they left school because they did not like it, many female dropouts left school because they became a parent (23%), were pregnant (31%) or wanted to get married (24%).
- After school-related reasons, most males left school due to economic reasons; they needed a job (15%) or had found a job (19%).

The change from student to dropout was not the only dramatic transition the 1988 eighth grade cohort experienced since leaving eighth grade. Also during this period, for the vast majority of the cohort, students changed to a new school for high school, and for some, a new school sector as well. In addition to the school location change, some cohort members experienced changes in family structure, environment, and home life.

This chapter studied the characteristics of 1988 eighth graders who had dropped out of school two years later and the reasons they reported for dropping out. In the next two chapters, with one exception[10], we focus exclusively on school-level changes and cognitive growth for the 94 percent of the eighth grade cohort who remained in school. To understand more fully the nature and scope of the changes adolescents encountered during this often turbulent period of their lives, the next chapter will examine school and family transitions.

[10] The exception is the discussion on family change, which is presented in terms of members of the eighth grade cohort who both dropped out of school and remained in school as of 1990.

Chapter 3: School and Family Transitions

Though the means by which school and family factors influence academic performance and social development continues to be debated, their association with performance and development is well documented. Past studies (for example, Zimiles & Lee, 1991; Ekstrom et al., 1987) have shown family characteristics to be strongly associated with tested achievement and with propensity to drop out of or persist in school. School characteristics as well, including learning environment and climate, have been found to be associated with educational outcomes (Bryk & Driscoll, 1988). Moreover, family and school factors may interact to reinforce or mitigate learning-related features of either setting.

Given the potential importance of family and school characteristics to an understanding of how students learn and succeed, it is not sufficient to document students' school settings and family situations as static contexts or at a single point in time. High school learning is affected by the experiences, both academic and familial, students encounter before they enter high school; such prior experiences encompass, as well, the family and school changes students undergo between elementary or intermediate school and high school. These alterations--positive and negative discontinuities--in family and school environments which students undergo between eighth grade and high school are the focus of this chapter. Investigated below is the question, "What kinds of school and family changes are students experiencing during these early years of high school?"

Specifically, Chapter 3 is divided into two sections. Reported *first* are findings on *change in* ***educational situation*** of 1988 eighth graders who were still enrolled in school two years later. Two kinds of changes are reported:

- **Movement across school sectors** (public and private) between eighth grade and high school; and

- **Changes in school environment**, such as:
  student perceptions of changes in course difficulty, teacher strictness, enforcement of school rules, and school social environment;
  differences in school safety; and
  differences in school climate.

In the *second* section of this chapter, descriptive statistics are reported on the positive and negative ***family events*** all members of the eighth grade class of 1988 (that is, both dropouts and students) experienced between 1988 and 1990.

The Transition to a New School for High School

What is the pattern or form of the transition from eighth grade to high school? While the majority of students change schools, how widespread is migration between public and private schools at this transition point? In what ways do students' school environments--viewed in terms of academic demands, disciplinary climate, safety, and school ethos--change as well? Descriptive findings concerning **sector changes** and **changes in learning environment** are reported below.

The period between eighth grade and tenth grade is one of pronounced educational, social, and psychological transitions. Transition to a new school, in particular, carries with it many changes. While the vast majority of students move to a different building for high school, there is great variation in the

pattern and consequences of this transition. Some students enter high school in ninth grade, others in tenth. Some move from middle school to high school, others from elementary, intermediate or junior high school to high school, and still others may not move at all but remain in the same school they attended in eighth grade.[1] Some also change sectors, from private to public schools or vice versa. High schools typically reflect different organizational structures from those of earlier grades, and may differ as well in their ethos or climate, and in the content, level of academic demand, and methods of presentation of the basic school subjects. Socially, students differentiate themselves into new groups; their educational or occupational aspirations may be affected by their high school experience, which is likely to be different from their experiences in the earlier grades.

A few students do not succeed in making the transition to high school at all, but leave school before reaching high school or very early in the high school years. Indeed, it has even been suggested that, for some students, the singular and unsettling act of changing from one school in eighth grade to a new school for high school may be a precipitating factor in dropping out (Roderick, 1993). Reportedly, some students suffer a decline in school performance after this transition from which they never recover (Blyth, Simmons & Carlton-Ford, 1983; Crocket, Peterson, Graber, Schulenberg & Ebata, 1989).

One facet of the critical transition to high school that the NELS:88 data illuminate is the pattern of sector change, that is, the movement between private and public schools (and between different types of private schools). A second facet elucidated by NELS:88 is the change in students' learning environment--for example, such academic and social aspects of schools as school safety, homework load, difficulty level of coursework, and enforcement of rules. These two aspects of the transition to high school-- change in school sector and difference in learning environment--may be posed as related questions:

- To what extent do public and private school eighth graders remain in the same sector for high school?
- In what ways and for whom do learning environments change?

A Typology of Sector Change

While the vast majority of students change school buildings between eighth grade and high school, most students remain in the same school sector. An overwhelming 89 percent of 1988 eighth graders changed to a new school building for high school, but only 7 percent changed school sectors (moved from a public to private school or vice versa). The low proportion of students who changed sectors reflects eighth grade school attendance patterns--most students (89%) attended a public school in eighth grade, and most public school eighth graders (98%) remained in public school for high school. Private school eighth graders were much more likely to change sectors at this transition point.

[1] Although the differences among middle, intermediate and junior high schools have become blurred over the years, middle schools are typically considered those that span grades 6, 7 and 8, while intermediate schools span grades 7 and 8, and junior high schools typically encompass grades 7, 8 and 9. The grade span of elementary schools ranges typically from some lower grade, for example, kindergarten or 1, 2, 3, through 5, 6, 7 or 8. These grade span arrangements are to some degree associated with different philosophies of middle school education, and with different sets of certain variations in educational practices. The type of school--its philosophical bent and students' level of maturity at the time of matriculation--from which students enter high school is often thought to influence high school experiences and outcomes.

Figure 3.1 illustrates the overall percentages of students who, after eighth grade, left each type of school examined in NELS:88[2] to attend some other type of school.[3]

As shown in Figure 3.1, private school eighth graders were considerably more likely than their public school counterparts to change to another type of school for high school. While just 2 percent of 1988 eighth graders left their public eighth grade school for some other type of school (either Catholic, independent or other private), 40 percent of Catholic school eighth graders, 44 percent of other private school eighth graders, and 26 percent of independent school eighth graders left their respective eighth grade private schools for another type of high school. Students attending an independent school in eighth grade were less likely than students attending a Catholic school to make a change to another type of school for 1990. In raw numbers, these percentages mean that approximately 50,000 public school eighth graders changed to another type of school for high school, while 141,000 private school eighth graders changed to another type of school for high school.

A large number of students left their private eighth grade school for another type of high school, but where specifically did they go? Collectively, when students who changed from one type of private school (i.e., Catholic, independent, and other private) are combined, the greatest migration was to public school. Of the eighth grade class of 1988 who changed type of school for high school, 66 percent changed from a private-eighth grade school to a public school, whereas 9 percent changed from a private-eighth grade school to another type of private school.[4] An examination of change at the level of individual school type, as shown in Table 3.1, reveals, however, that only Catholic school eighth graders and other private school eighth graders changed primarily to public school. As shown in Table 3.1, more than one-third of other private school (38%) and Catholic school eighth graders (37%) changed to public school, whereas students attending an independent school in eighth grade changed to public school at a rate half that (15%) of Catholic and other private school students.

Thus, unlike public school eighth graders (who typically remain in the same sector for high school), the pattern of sector transition is more complex for private school eighth graders. Among private school eighth graders, Catholic and other private school eighth graders are more likely to enroll in the public sector, whereas independent school eighth graders disperse equally to both public and other types of private sector schools.[5]

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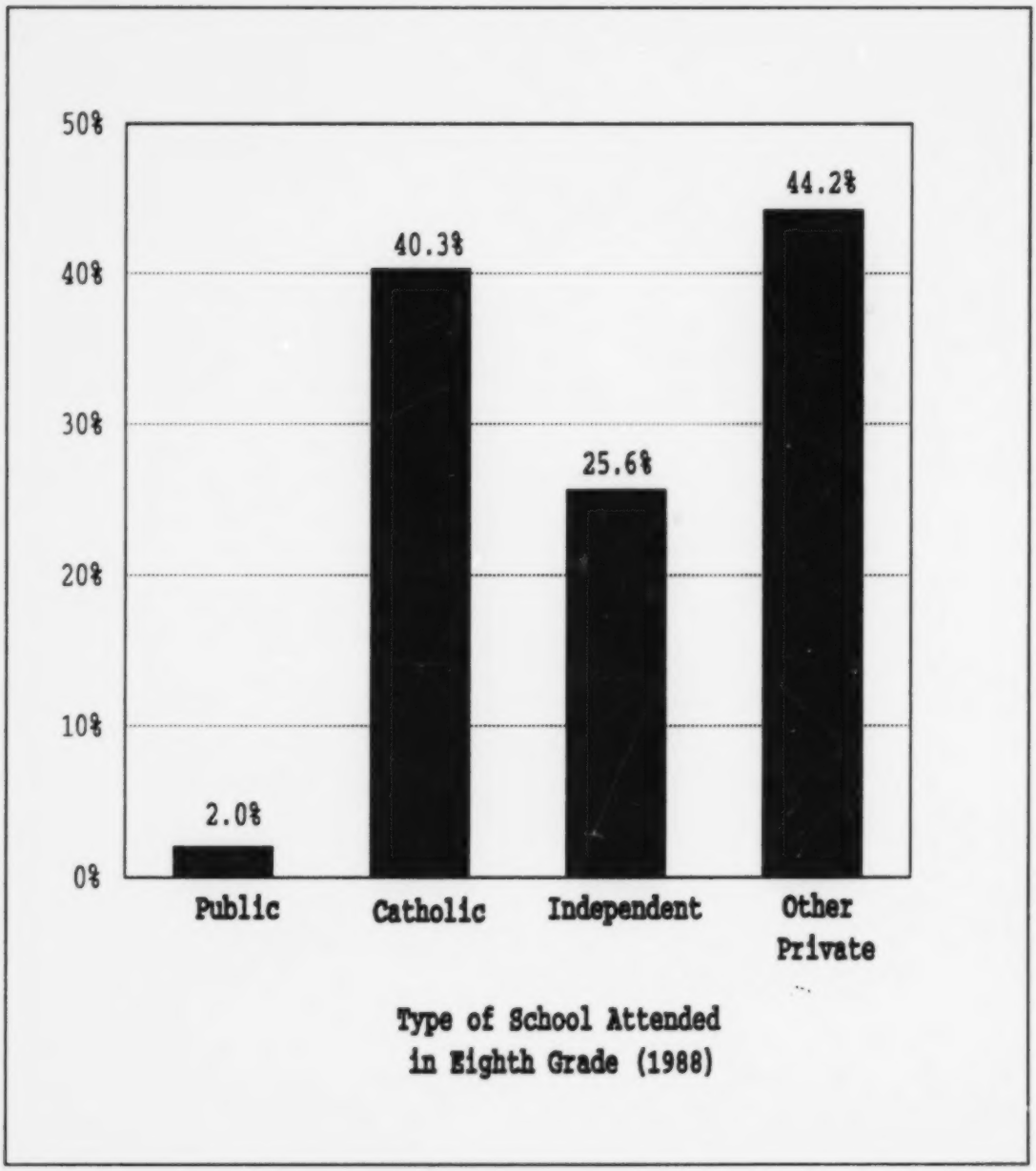
[2] Three types of private schools are examined in NELS:88: Catholic, "independent", and "other private". The "independent" classification refers to a group of private schools which are members of the National Association of Independent Schools [NAIS]. These schools have a strongly academic orientation and are primarily nonsectarian, but include some schools with an explicit religious orientation or affiliation. The "other private" category refers to private schools that do not classify themselves as either Catholic or independent. The types of schools included in this category are Lutheran, fundamentalist Christian academies, and Jewish schools, as well as nonsectarian non-NAIS institutions.

[3] In this report "type of school" means either a public school or specifically one of the three types of private schools examined in NELS:88, Catholic, independent or other private. The term "sector", on the other hand, refers to moving to or from either a public school (the public sector) or any one of the three types of private schools examined in NELS:88 which collectively make up the private sector.

[4] These percentages cannot be derived from Table 3.1. Table 3.1 is an all-inclusive presentation of change reporting both students who did not change school types and those that did. The percentages cited here are calculated on a subset of the longitudinal cohort--only cohort members who changed to a different type of school for high school.

[5] Readers who are interested in the characteristics of students who change school sectors between eighth and tenth grades, should consult NCES's report, *Students' School Transition Patterns Between Eighth and Tenth Grades Based on NELS:88* (Myers & Heiser, 1995).

Figure 3.1
Percentages of 1988 eighth graders by type of school attended in 1988 who had changed to a different type of school by 1990



SOURCE: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Table 3.1 **Percentages of the longitudinal cohort by type of school in eighth grade (1988) by type of school attended in 1990.**

Type of Eighth Grade School Attended in 1988	Type of School Attended in 1990			
	Public	Catholic	Indep.	Other Priv.
Public	98.0	1.1	0.3	0.5
Catholic	37.1	59.6	2.1	1.2
Independent	15.0	6.5	74.4	4.1
Other Priv.	37.8	6.4	0.0	55.8

NOTE: Percentages may not sum to 100 percent due to rounding.

SOURCE: National Education Longitudinal Study of 1988, First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

What might private school eighth graders who matriculated to the public sector have to say about the learning environments of their new public high schools? How might their experiences differ from the experiences of other eighth graders who changed from the public to the private sector, or who remained within the same sector? These questions are investigated in the next section of this chapter for those numbers of the 1988 eighth grade cohort who changed to a new school for high school.

Changes in Students' School Environments

Sector change is only one of many possible school-level changes of environment. Meaningful generalizations can, to be sure, be made about differences between public and private schools, and change from one sector to another typically brings with it various changes in school environment. Nevertheless, American public and private schools are diverse in their character, and changes within a sector may lead to changes in the school environment as well. Middle or junior high schools are often organized differently from high schools, and may follow different instructional practices and educational philosophies. Public schools may be large or small, but on average public high schools are larger than the public eighth grade schools that feed into them. Any given public school may have strong or weak academic standards, may serve rural, urban or suburban populations, and may serve families of high- or low socioeconomic status (SES). Private schools may be religious or secular in orientation, may have very strict or very loose disciplinary structures, and may have higher or lower academic standards. It is therefore useful to examine directly (that is, independently of change of sector) other changes in the student learning environment. One of the more interesting ways such change in school environment might be investigated is by looking at students' own reports of the differences they perceive between their eighth grade and high school environment. The 1990 survey asked 1988 eighth graders about differences in academic standards, disciplinary climate, and social climate. Specifically, students were asked whether

- courses were harder in high school?
- teachers were more strict?
- school rules were more strictly enforced?
- it was more difficult to make friends?
- student feels more alone in high school?

These questions can be used to examine the perceived changes in students' school environment between eighth grade and high school. Later in this chapter, the following additional aspects of school environment will be examined:

- School crime and safety, and
- School climate.

Unlike the preceding section on sector change, for all analyses of environmental change, change is examined for students who change to a new school for high school.

School experiences thought to be closely related to achievement include time spent on homework, courses completed, and behavior in school (for example, whether one has disciplinary problems) (Ekstrom, Goertz, and Rock, 1988). However, many other school characteristics--including students' perceptions of the degree to which their environment is supportive and engaging, or alienating, the degree to which rules are explicit and consistently enforced, and the degree of perceived academic demand--may also influence student achievement. Specifically, alienating environments are those perceived by students and/or faculty to be deficient in warm student-teacher relationships, just and effective discipline, school spirit, shared experiences, a safe environment, and high academic standards.[6] The aspect of disciplinary climate is of particular interest--do students experience their high schools as a more or as a less disciplined environment than eighth grade? The importance of student perceptions of the degree of discipline or order in their schools has been documented in the literature on the correlates of disorderly schools (Gottfredson, 1990; Gottfredson & Gottfredson, 1985; The Safe School Study, 1978). Schools with discipline problems suffer a lack of clarity about rules, display a lack of fairness and firmness in their enforcement, and respond ambiguously to student misconduct. Students' perceptions of the school's disciplinary climate contribute to that climate and affect the nature and quality of student-staff interactions within the school. Next, then, it is necessary to examine whether, and in what ways, students' high school environments were perceived to be different from eighth grade school environments. Figure 3.2 summarizes student reports comparing their first year of high school[7] to the year before with respect to (1) academic emphasis/standards (i.e., "Courses were harder in high school" and "Teachers were harder in high school"); (2) disciplinary climate (i.e., "School rules were more strictly enforced"); and (3) social climate (i.e., "It was more difficult to make friends in high school" and "I felt more alone in high school"). As shown in Figure 3.2, in the first year of high school, students perceived their new school environment as differing from that of their eighth

[6] Some recent research on the effects of school structure on student performance and persistence (Bryk & Raudenbush, 1988; Bryk & Thum, 1987; Newmann, 1988) suggests the possibility that many of the policies and practices adopted by schools over the past 25 years, such as greater curriculum and faculty diversification, and larger schools and classrooms, create alienating rather than engaging environments which suppress rather than foster learning.

[7] For the majority of the eighth grade cohort, their first year of high school was ninth grade; for the minority, their first year of high school was tenth grade.

grade school.[8] In terms of academic standards and discipline, for the majority of the eighth grade cohort, the first year of high school was perceived as more difficult than the year before. For nearly one out of five students, the social milieu of their new school was perceived as more unfriendly[9] and lonely than they had encountered in their eighth grade school.

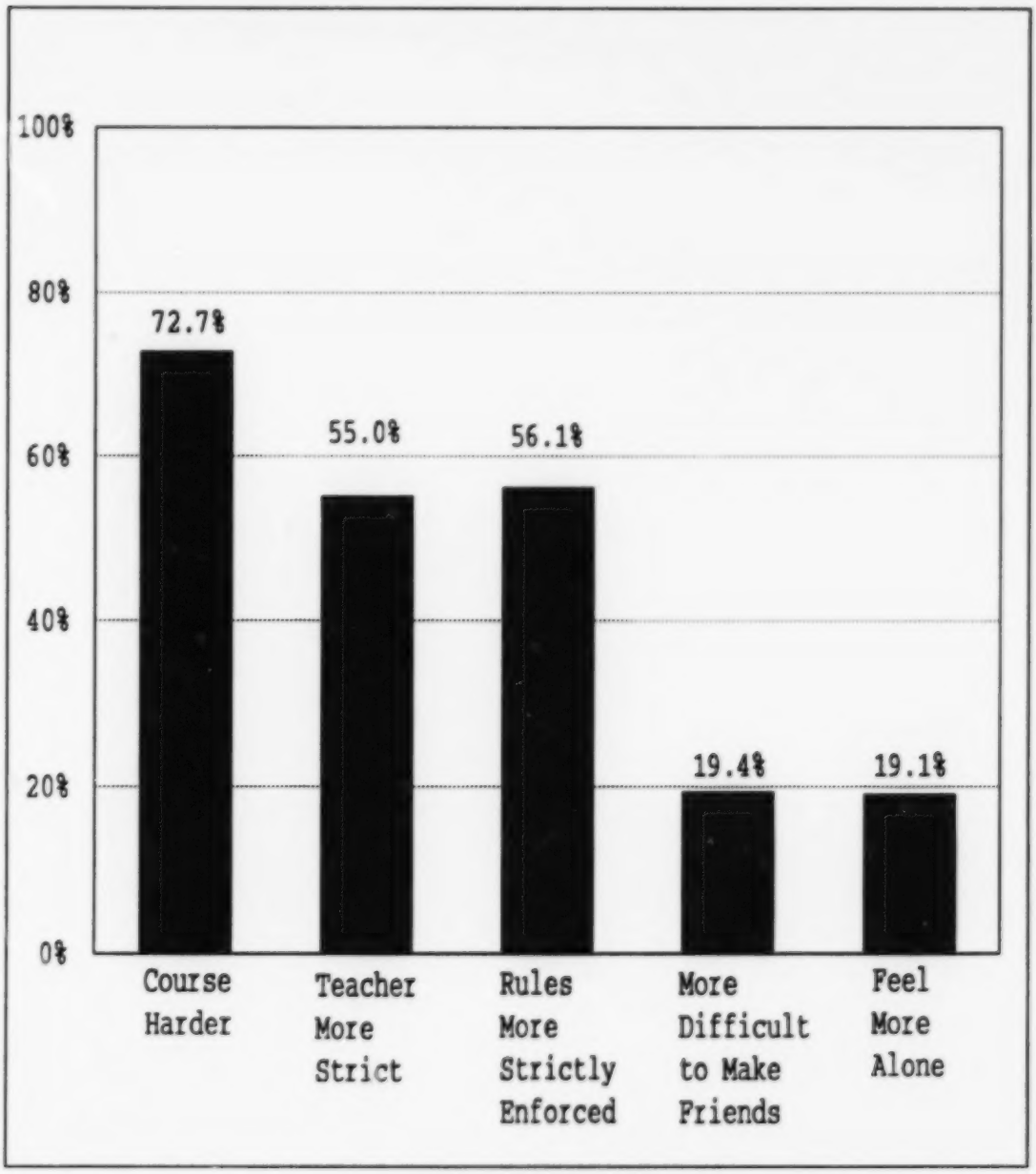
Nearly three-fourths (73%) of the eighth grade class of 1988 who were in high school in 1990 agreed that first year high school coursework was more difficult than the previous year's coursework. More than one-half of the cohort perceived high school teachers as more strict (55%) and high school rules as more strictly enforced (56%) than in the year before. About one out of five students believed that it was more difficult to make friends (19%), and felt more alone in high school (19%), than in the previous year.

That nearly three out of four students felt that first year high school coursework was more difficult than the previous year's coursework is noteworthy. One of the objectives of the grade-level based education system is to ready students at each grade for the material and coursework of the following grade. Thus, in light of this premise of readiness, it is curious to find that a substantial number of students found the first year of high school to be more difficult, academically, than the year before. It is unclear from simple response frequencies, however, whether this perception on the part of students reflects an objective (or expected) difference in intellectual environment between students' eighth grade school and high school or effects of the stresses and strains of their transition to a new school.

[8] Eighth grade school describes the school the student attended the year before high school. Thus, whether they were in eighth or ninth grade in the year before high school, they were nevertheless attending the school where they had attended eighth grade.

[9] The exact wording for this item appears in Appendix C.

Figure 3.2
Percentages of 1988 eighth graders who reported they agreed or strongly agreed with the following statements about their first year of high school relative to the year before



SOURCE: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

To use more objective indicators of academic rigor or demand, the time students invested in homework in eighth grade was compared to the time spent on homework outside of school in high school. Roughly comparable homework items appeared in both the base year and first follow-up student questionnaires, which permitted calculation of individual base year to first follow-up change scores.[10] Change scores were calculated specifically to investigate overall change and differential change--two types of findings that are masked when solely aggregate base year percentages are compared to aggregate first follow-up percentages. By subtracting the number of hours students reported doing homework outside of school in the base year from the number of hours they reported doing homework in the first follow-up, students could be classified as not changing, doing more, or doing less homework in high school relative to eighth grade. Table 3.2 reports the percentages of students who fell within each of these categories by selected background characteristics.

Overall change and the direction of change. Across all subject matters--mathematics, English, science, and history--slightly more than one-half of the eighth grade cohort spent about the same amount of time doing homework in high school as they did in eighth grade.[11] Indeed, for math, 55 percent; science, 57 percent; English, 56 percent; and history, 56 percent of the eighth grade cohort reported no change between eighth grade and high school in the amount of time they spent doing homework outside of school.

However, when students' reported behavior did change between eighth grade and high school, a significantly greater percentage of the cohort reported doing more rather than less homework at home in high school than in eighth grade. The percentages of students doing more homework at home in high school compared to eighth grade appeared to be fairly stable across the four subject areas. Thus, it does not appear as if high school emphasizes one subject area more than another subject area. Across all subject areas, about one-quarter (math, 25%; science, 27%; history, 27%; English, 29%) of the eighth grade cohort reported doing more homework outside of school in high school compared to the approximately 15 percent of the cohort who reported doing less homework outside of school in high school than in eighth grade (math, 20%; science, 13%; history, 17%; English, 16%).

[10] The specific procedures employed for calculating change scores are reported in the Technical Appendix, Appendix B.

[11] Percentages reported in Table 3.2 are based on individual change scores for time spent on homework, and may differ from students' perception of difficulty level. A finding of substantially fewer students doing more homework in high school than reporting first year high school coursework as difficult should not be interpreted as a contradiction of the earlier finding. It may be that a lower percentage of students doing more homework in high school (than reporting first year high school coursework as difficult) reflects an adjustment to high school, since for the majority of the eighth grade cohort the former item is a measure of their first year of high school, whereas this latter item is a measure of their second year of high school. Or it may be that, while students perceived high school coursework as more difficult, "difficult" means something other than "more homework." "Difficult" may mean classes are more cognitively complex in high school than in eighth grade. Both the difficulty of high school coursework and the amount of homework assigned in high school are limited measures of a school's level of academic emphasis. The former item is limited because of the ambiguity of the term "difficult." The latter item is limited because there is not always a one-to-one correspondence between the amount of homework assigned in class and the academic demand of the class. For example, a teacher of an academically challenging class may have many students, and as such, assign less homework than a teacher of a less challenging class who instructs fewer students. On the other hand, students in advanced courses who are assigned more challenging homework may not require as much time for homework as less able students in less challenging courses. Nonetheless, it is interesting to investigate, for the majority of students, just how much they are studying in their second year of high school.

Table 3.2 Percentages of 1988 eighth graders doing the same, more, or less homework in high school (1990) than in eighth grade (1988) by selected background characteristics and subject area

	Math			Science			English			History		
	No Change	More	Less	No Change	More	Less	No Change	More	Less	No Change	More	Less
Total	54.9	25.3	19.8	57.3	27.3	13.4	55.5	29.1	15.5	56.2	26.8	17.0
Sex												
Male	57.7	22.4	20.0	62.3	24.3	13.5	57.7	25.8	16.6	59.2	24.0	16.9
Female	52.2	28.3	19.5	56.3	30.3	13.4	53.4	32.3	14.4	53.2	29.7	17.2
Race/Ethnicity												
API	47.9	35.2	16.9	40.4	49.5	10.1	46.0	41.9	12.2	47.7	35.9	16.4
Hispanic	56.4	27.9	15.7	62.5	27.4	10.2	57.4	29.7	13.0	57.9	27.2	15.0
Black	58.4	26.7	15.0	61.7	25.3	13.0	52.9	33.6	13.5	58.9	26.9	14.2
White	54.5	24.3	21.2	58.8	27.1	14.1	56.0	27.8	16.3	56.0	26.3	17.7
American Indian	58.0	28.6	13.4	67.3	24.5	8.2	58.5	28.1	13.4	57.8	28.6	13.6
BY SES Quartile												
Lowest	60.1	23.3	16.6	62.5	23.3	14.2	59.8	25.6	14.7	59.0	25.1	15.9
Second Lowest	58.3	22.6	19.1	61.6	24.0	14.4	57.8	26.2	16.0	57.4	26.4	16.2
Second Highest	55.2	24.7	20.1	59.1	28.2	12.7	54.7	30.7	14.6	59.4	24.5	16.2
Highest	48.1	29.8	22.2	55.3	32.0	12.8	51.1	32.5	16.4	50.4	30.4	19.3
BY Test Quartile												
Lowest	62.9	22.1	15.1	65.4	20.9	13.8	57.6	26.8	15.6	62.8	23.7	13.5
Second Lowest	59.1	24.7	16.2	61.8	25.5	12.8	59.6	26.6	13.8	57.0	27.5	15.5
Second Highest	54.9	25.7	19.4	59.6	26.9	13.5	57.3	28.3	14.5	55.3	26.9	17.8
Highest	46.5	28.1	25.4	54.2	33.2	12.6	50.1	32.8	17.1	52.6	28.5	18.9
Changed Sectors												
Public to Private	58.0	27.4	14.6	50.7	38.2	11.1	48.0	37.5	14.4	63.6	29.8	6.6
Private to Public	53.2	25.8	21.0	59.2	27.7	13.1	51.3	27.1	21.6	47.4	27.6	25.0
No Change	54.8	25.3	19.9	59.5	27.1	13.4	56.0	28.9	15.2	56.7	26.6	16.8

NOTE: Percentages may not sum to 100% due to rounding. A category giving the students the option to respond that they are not currently enrolled in a specific course allows them to be excluded from this analysis.

SOURCE: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Subgroup differential change. In terms of who is doing more homework outside of school for high school compared to eighth grade, the percentages reported in Table 3.2 reveal a clear and strong profile. Regardless of the subject area, females, Asian students, students in the highest SES quartile, and those scoring in the highest quartile on the base year cognitive test were generally more likely to have stepped up their studying since eighth grade than other groups of students.

A consistently and significantly greater number of females than males were doing more homework in high school. Consistent with the literature, female cohort members appeared to be exerting greater effort in school than their male classmates. For female cohort members, 28 percent in math, 30 percent in science, 32 percent in English, and 30 percent in history were doing more homework outside of high school than in eighth grade. For male cohort members, 22 percent in math, 24 percent in science, 26 percent in English, and 24 percent in history were doing more homework in high school relative to eighth grade.

When one examines who was doing more homework by race and ethnicity, notably higher percentages than the overall 25-30 percent were consistently observed for students of Asian background. For Asian students, change was registered most in the subject areas of science and English, where 50 percent and 42 percent, respectively, reported an increase in the amount of time they spent on homework in these subjects at home; this is compared to the approximately one-quarter of students of other races and ethnicities who were doing more homework outside of high school. This pattern of Asian-American groups academically investing more effort than other minority groups (and often times the white majority as well) has been observed for the past four decades and has led some to state that it is "one of the most remarkable phenomena" in ethnic minority research (Sue & Okazaki, 1990). As shown in Table 3.2, Asian students were more likely than almost all other racial/ethnic groups (with the exception of blacks and American Indians in English) to have changed to doing more science and English homework.

Also noteworthy were the similar patterns of change observed between students in the lowest and highest SES quartiles and lowest and highest base year test quartiles. For both characteristics, (not surprisingly owing to the high correlation between SES and test achievement), high-quartile students were more likely than low-quartile students to do more English, math, and science homework in high school compared to eighth grade. For low-SES students, 23 percent in math, 23 percent in science, and 26 percent in English were doing more homework in high school, whereas for high-SES students, 30 percent in math, 32 percent in science, and 33 percent in English said they were doing more homework in high school than they did in eighth grade. The pattern was almost identical for low- and high-base year test quartile students.

Although it is not possible through univariate analyses (and simple tests of association) to fully disentangle the separate effects of changing to a new school from the effects of changing school sectors, the pattern of responses among students who changed and did not change school sectors suggests that, in general, all types of high schools appear to be more demanding academically than eighth grade schools. Both for students who changed sectors and those who did not, the trend was the same as that for the cohort overall--students were doing more rather than less homework in high school compared to eighth grade. One difference was observed. Students who switched to a public high school from a private eighth grade school and students who did not change to a new sector for high school were far more likely than students who changed to a private high school (from a public eighth grade school) to spend less time on history homework. About a quarter (25%) of students who switched from a private to a public sector school and 17 percent of no change students were spending fewer hours on history homework compared

to students who changed to a private school, where roughly 7 percent were spending fewer hours on history homework.

Summary

To derive a sense of how the academic environments of high schools and eighth grade schools may differ, two analyses were conducted. The first analysis investigated eighth grade schools' and high schools' level of academic demand through a single item that asked students to directly compare high school coursework to eighth grade coursework. The second analysis examined differences in intellectual milieu through a behaviorally-based measure of change, from the base year to first follow-up, in amount of time students spent doing homework at home. While 73 percent of the eighth grade cohort perceived first year high school coursework as more difficult than eighth grade coursework, only about one-quarter of the cohort reported doing more homework in each of the four basic subject areas. Specifically, about 55 percent of the cohort spent the same time on homework in high school as in eighth grade, nearly 26 percent spent more time in high school, and approximately 16 percent spent less time on homework in high school.

Despite the problems associated with using such measures as "time spent on homework" to assess academic demand, the data presented suggest that a good part of academic demand emanates from the student him/herself. Consistently observed as studying more were Asians, females, students in the highest SES quartile, and those scoring in the highest quartile on the base year cognitive test--precisely those groups of students who consistently demonstrate good study habits and a high motivation to learn. Of course, course selection too, plays a mediating role. Students who select more challenging courses are more likely to be required to complete high amounts of homework than those who do not.[12]

A school's prevailing ethos is a blend and a balance of a number of different factors. In addition to the emphasis a school places on academics, other factors, for example, school policies on rules of proper conduct, school safety, the fairness of discipline, and the quality of teacher-student relationships and teacher instruction, also contribute to the creation of an atmosphere that may either inhibit or foster learning. The next section examines how eighth grade cohort members' first follow-up schools differ from their base year schools with respect to other dimensions of school climate. Particularly, this next section concentrates on **high school safety** and **overall climate** relative to eighth grade school safety and overall climate.

School Crime and Safety as an Aspect of School Climate

"By the year 2000, every school in America will be free of drugs and violence and will offer a disciplined environment conducive to learning." So reads the sixth goal of the National Education Goals.[13] As research on school effects and school violence and crime suggest, these objectives are not unrelated (Bryk & Thum, 1989; Wehlage & Rutter, 1986). A disciplined environment, school learning, and school crime are interwoven. Crime (and other problems such as school dropout, truancy, and absenteeism), it

[12] On race/ethnicity, achievement scores, and SES differences in rigorous course taking, see chapter 5 of Pelavin and Kane, 1990, and Ingels, Schneider, Scott and Plank, 1994; on race/ethnicity differences see also Legum et al. 1993 Table 16; on the relationship between rigorous course taking and homework, see Ekstrom, Goertz and Rock, 1988, p.104.

[13] The National Goals Panel (1991). *Building a Nation of Learners: The National Education Goals Report.* The National Governors' Association (1990). *Education America: State Strategies for Achieving the National Education Goals.* Report of the Task Force on Education.

has been suggested, will be lowest in environments that are conducive to learning because under such conditions both students and teachers together are busily and respectfully engaged in the pursuit of knowledge and have little time for anything else (Newmann, 1988).[14]

Clearly, safety and crime are integral parts of a school's overall learning environment. Intuitively, if a student is worried about his or her own safety at school, attendance, let alone engagement and actual learning, is likely to be difficult. Likewise, if administrators and teachers must spend even a small portion of their time policing hallways and classrooms, that much less is left for instruction. Little learning and development may be accomplished in a school fraught with thefts, fights, and drug pushers.

How safe were students' 1990 high schools compared to their 1988 eighth grade schools? Were high schools, in their need to accommodate greater diversity and autonomy among students, more likely to breed thefts and fights than eighth grade schools? Was the eighth grade class of 1988 more concerned about its safety in high school than in eighth grade? The NELS:88 data suggest that, in some respects, students did not worry more about their safety in high school than they did in eighth grade. In fact, when one looks at **individual change** both behaviorally (that is, the incidence of school crime) and perceptionally (that is, students' feelings of being safe or unsafe) between the base year and first follow-up, the data suggest that high school is a safer place than eighth-grade school. However, when one looks at **aggregate percentages** overall, the number of students feeling unsafe or experiencing crime in high school is as unacceptably high in high school as it was in eighth grade.

In this chapter, first, high school safety will be examined relative to eighth grade safety by examining behavioral measures of school crime and, then, students' perceptions of safety. The school crime items or behavioral measures of safety are considered to be more objective measures of safety than student perceptions because they are not subject to personal definitions of safety. To some extent, safety is in the eye of the beholder. For example, to inner city students, who in order to get to school must cross through parts of town known for gang shootings, thefts and fights, school may be perceived as relatively safe and secure--objectively, the safest environment that the child has.[15] In contrast, to some rural or suburban students who live in safe homes and secure neighborhoods, that same school may be perceived as a frightening environment. Relative or subjective, though they may be, a student's perceptions should not be ignored. Perception alone, regardless of whether or not a student has experienced an unsafe situation, may influence his/her performance. Thus, it is important to examine both incidence of crime and students' perceptions of safety in order to understand the relationship between school safety and achievement.

To address in what way and for whom school crime changed since the base year, two types of analyses were conducted. First, individual base year to first follow-up change (or difference) scores were calculated, and students were categorized as experiencing more, fewer or the same number of acts of school crime in the first follow-up as in the base year. Second, aggregate base year percentages of

[14] The *Safe Schools Study Report to Congress* (1978) provides some empirical support for the notion that school climate influences school crime. Among 22 factors that were found to be consistently related to school violence and property loss were the school climate factors of fair and effective discipline and high academic demand (the latter defined as students' desire to get good grades). Violence was found to be lowest in schools where principals firmly but fairly administered discipline and where students placed a high premium on achieving good grades.

[15] Indeed this was a finding of the Safe Schools Study (*Safe Schools Study Report to Congress*, 1978). Schools located in high crime neighborhoods were found to be safer than the surrounding community.

students experiences of petty crime were compared to aggregate first follow-up percentages of the same acts of petty crime.

Both analyses are presented, because neither one alone illuminates change in safety and school crime fully. Side by side comparisons of aggregate percentages may mask change if equal numbers of students changed in opposite directions, thereby canceling any record of change. Moreover, comparisons of aggregate percentages do not permit investigation of differential change--that is, who or what changed and how. In order to address questions of differential change, change was investigated through individual change (or difference) scores. Change scores make use of the data longitudinally by utilizing individual observations from two different points in time, the base year (time 1) and first follow-up (time 2). Through this method, it is possible to describe, for example, not only how school crime may have changed in the move from eighth grade to high school, but also for whom school crime increased or decreased since the base year. For example, were males more likely than females to experience an increase in threats of physical harm in high school compared to eighth grade?

Change scores too, however, are limited because they are not informative of the greater phenomenon under investigation.[16] For example, between 1988 (the base year) and 1990 (the first follow-up), one-half (53%) of the eighth grade cohort experienced the same number of personal thefts in high school as in eighth grade, 21 percent experienced more, and slightly more than a quarter (26%) experienced fewer personal thefts. While these data say much about change overall and the direction in which change took place, they do not provide information about the frequency of personal thefts overall in high school relative to eighth grade. For this latter information one must refer to the side by side comparison of aggregate base year percentages to aggregate first follow-up percentages, which provide a context for further interpretation of change.

Because the focus of this report is on differential change, we both present and discuss the results of the change analyses based on difference scores, while we only present, and occasionally refer to, the aggregate base year to first follow-up percentages. Primarily, aggregate percentages of base year and first follow-up acts of crime and perceptions of safety are being reported in anticipation of the question, "But how many students overall experienced these acts of crime in the base year and first follow-up?"

In the following section, Table 3.3 presents the percentages of students who experienced a change in acts of school crime between eighth grade and high school overall, and the direction that change took. Comparisons of students' base year reports of school crime to their first follow-up reports are presented in Table 3.4. This same pattern of presentation is repeated in the section on students' perceptions of the climate of their high schools. First, school safety as measured through behavioral accounts of school crime will be examined.

Behavioral Manifestations of School Crime

To address the questions "in what way" and "for whom" school crime had changed since the base year, individual base year to first follow-up change scores were calculated. The behaviorally-based school

[16] A more detailed discussion of the use of change scores is presented in Appendix B.

items examined, asked students to report the frequency[17] with which the following things happened to them in the first half of the current school year:

(1) "I had something stolen from me,"

(2) "Someone offered to sell me drugs," and

(3) "Someone threatened to hurt me."

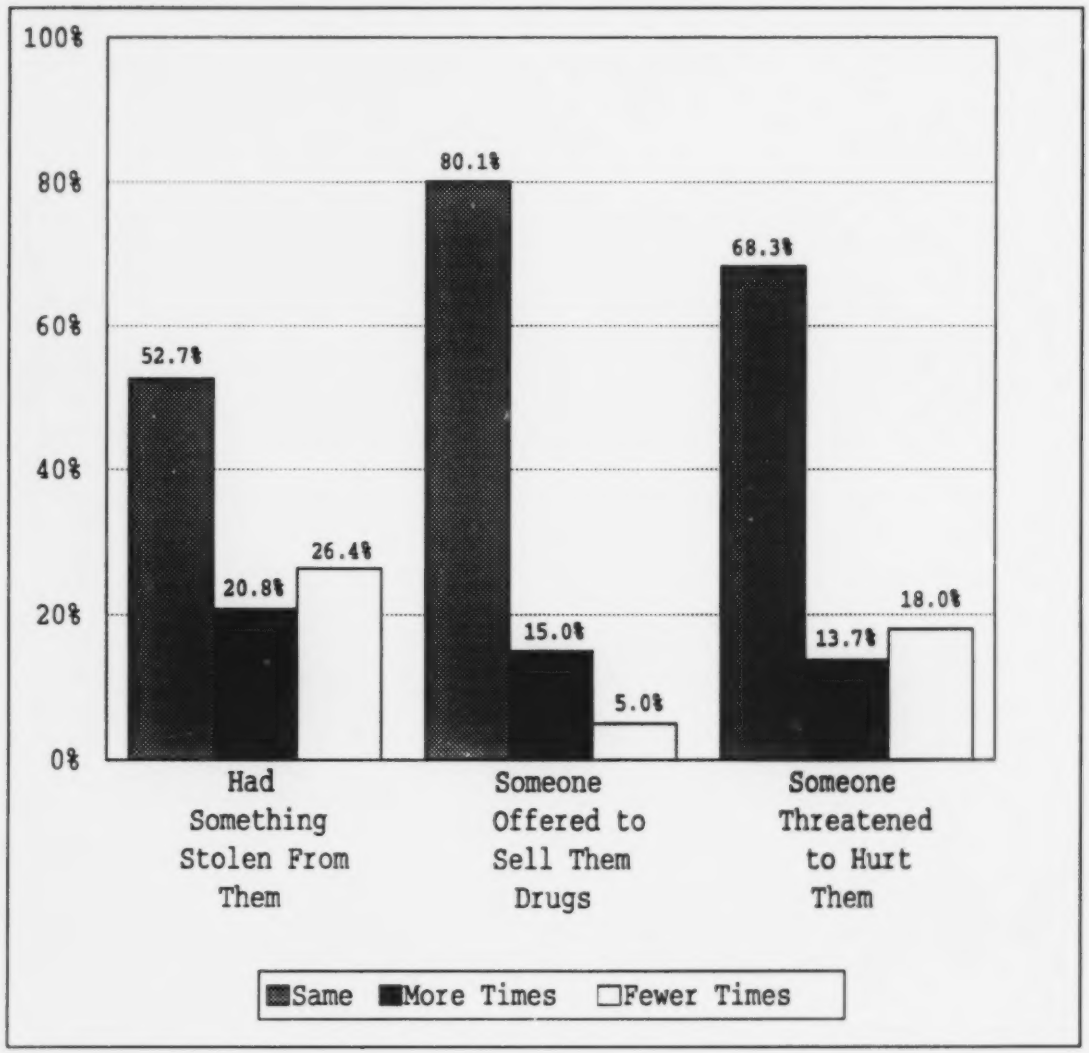
Students' base year responses for each item were subtracted from their first follow-up responses, allowing students to be classified as not experiencing a change since eighth grade in the number of incidences of school crime occurring to them, experiencing more incidences, or experiencing fewer incidences of school crime.

Overall change and the direction of change. Though the number of students who experienced a change--either for the better or worse--in school crime varied by measure, on all three measures the number of students reporting a change was substantial. Figure 3.3 shows the percentages of 1988 eighth graders who did and did not experience a change in school environment on the three measures of school crime. Almost one-half (47%) of the eighth grade cohort experienced a change in terms of personal thefts, close to one-third (32%) reported a change with respect to threats of physical harm, and nearly one out of five students (20%) encountered a difference between their eighth grade school and high school in terms of being approached to buy drugs.

Of greater interest than the percentages of students experiencing a change was the direction in which change was experienced. Figure 3.3 and Table 3.3 report the percentages of the eighth grade class of 1988 who experienced a change in school crime between eighth grade (1988) and high school (1990) and the direction of that change, either for the better (fewer incidences of crime occurring in high school than in eighth grade) or worse (more occurring), overall and by selected background characteristics.

[17] For all three measures of school crime and safety, respondents reported the frequency of such occurrences in terms of "never", "once or twice", or "more than twice."

Figure 3.3
Percentages of 1988 eighth graders who did and did not experience a change in the following safety related behaviors in the move from 8th grade to high school



SOURCE: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Table 3.3 **Percentages of 1988 eighth graders who reported that the following acts of school crime occurred the same number, more, or fewer times in their 1990 school than in their 1988 eighth grade school by selected background characteristics**

	Had something stolen at school			Someone offered to sell me drugs			Someone threatened to hurt me		
	same	more times	fewer times	same	more times	fewer times	same	more times	fewer times
Total	52.7	20.8	26.4	80.1	15.0	5.0	68.3	13.7	18.0
Sex									
Male	51.9	22.5	25.7	75.8	19.0	5.2	63.4	15.8	20.8
Female	53.7	19.1	27.1	84.4	10.9	4.7	73.1	11.7	15.2
Race/Ethnicity									
API	58.1	18.4	23.6	84.6	12.6	2.8	75.7	10.3	14.1
Hispanic	51.9	21.1	27.0	76.1	15.4	8.6	67.9	14.6	17.6
Black	45.3	23.4	31.4	84.6	10.2	5.3	73.4	11.0	15.6
White	54.0	20.4	25.5	79.7	15.8	4.4	67.1	14.2	18.7
American Indian	45.3	23.2	31.5	74.5	16.5	9.0	65.8	15.3	18.8
BY SES Quartile									
Lowest	52.9	20.4	26.7	80.1	13.0	6.9	66.3	14.0	19.7
Second Lowest	50.8	20.6	28.6	79.6	15.8	4.6	67.0	14.8	18.2
Second Highest	52.9	20.8	26.2	78.9	16.8	4.4	68.5	14.7	16.8
Highest	54.3	21.2	24.4	81.8	13.8	4.4	70.7	11.5	17.8
BY Test Quartile									
Lowest	50.1	20.8	29.1	74.1	18.3	7.6	67.2	15.1	17.7
Second Lowest	50.2	21.9	27.9	78.4	16.7	4.9	66.2	12.6	21.2
Second Highest	54.6	19.5	26.0	80.3	15.0	4.7	69.0	14.4	16.6
Highest	56.2	21.3	22.6	86.8	10.7	3.5	71.0	12.2	16.8
Changed Sectors									
Public to Private	56.7	9.6	33.7	85.0	6.3	8.7	65.3	6.8	27.9
Private to Public	55.4	22.6	21.1	80.2	18.5	1.4	74.0	15.0	11.0
No Change	52.7	21.0	26.4	80.2	14.9	5.0	68.1	13.7	18.3

NOTE: Percentages may not sum to 100 percent due to rounding.

SOURCE: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Table 3.4 **Percentages of 1988 eighth graders who reported that the following acts of school crime happened to them at least once in their 1988 eighth grade school and their 1990 school**

	Had something stolen from me		Someone offered to sell me drugs		Someone threatened to hurt me	
	1988	1990	1988	1990	1988	1990
Total	49.9	44.3	9.4	18.1	28.3	23.6
Sex						
Male	51.4	49.0	10.8	23.0	33.3	28.3
Female	46.3	39.7	8.0	13.2	23.0	18.9
Race/Ethnicity						
API	50.1	45.6	5.0	14.3	20.9	15.6
Hispanic	48.3	41.9	14.1	19.3	24.4	20.2
Black	59.1	53.4	7.2	11.2	23.9	20.0
White	47.2	43.0	9.3	19.3	29.9	25.3
American Indian	50.6	45.9	15.6	19.5	25.9	22.4
BY SES Quartile						
Lowest	49.7	44.5	12.0	16.6	28.7	22.9
Second Lowest	51.5	45.0	8.8	18.7	29.0	25.9
Second Highest	48.9	44.7	10.2	20.4	26.9	23.8
Highest	46.2	43.3	7.3	16.4	28.1	21.9
BY Test Quartile						
Lowest	53.9	47.8	14.3	23.2	27.0	23.9
Second Lowest	51.4	46.3	10.2	20.3	30.5	22.6
Second Highest	48.8	43.8	8.6	17.4	27.7	25.2
Highest	42.7	41.9	5.9	12.8	26.9	22.3
Changed Sectors						
Public to private	51.1	28.3	10.8	10.8	32.1	12.8
Private to public	37.0	39.2	2.1	18.9	17.5	21.2
No change	49.5	45.1	9.6	18.7	28.6	23.9

SOURCE: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

As shown in Table 3.3, the direction of change varied by measure. In terms of personal thefts and threats of physical harm, more students reported that such incidents occurred fewer times, rather than more, in high school than in eighth grade. Slightly more than a quarter (26%) of the eighth grade class of 1988 reported experiencing fewer personal thefts in high school than in eighth grade, whereas 21 percent reported thefts occurred more often in high school than in eighth grade. Also significant and suggestive of a safer environment in high school, 18 percent of the eighth grade cohort reported fewer encounters with someone threatening to hurt them in high school than in eighth grade, whereas 14 percent reported more of such encounters in high school than in eighth grade.

While the frequency of thefts and threats of physical harm decreased in the move from eighth grade to high school--perhaps due to students' maturing or learning how to protect themselves, or to disruptive students dropping out of school--encounters with drug pushers rose. Overall, 15 percent of 1988 eighth graders reported being approached to purchase drugs more in high school than in eighth grade, and 5 percent reported fewer encounters with drug pushers in high school than in eighth grade. This substantial increase from eighth grade to high school in exposure to the sale of drugs is also evident in the percentages reported in Table 3.4. (Table 3.4 compares base year aggregate percentages to first follow-up aggregate percentages by selected background characteristics.) In intermediate, middle or junior high school in 1988, 9 percent of the eighth grade cohort was approached to buy drugs at least once. Two years later, in 1990, encounters with drug pushers had doubled to 18 percent.

Subgroup differential change. For *whom* is high school more or less safe (as measured by reported incidence of crime)? Safety appears to vary according to one's gender, race/ethnicity, base year test quartile, and whether or not one changed school sectors (changed from a public sector school to a private sector school or from a private sector school to a public sector school). (Differential change by background characteristics is also reported in Table 3.3.)

Males and females experienced change in the security of their schools differently. Not only were males more likely than females to experience change in the move from eighth grade to high school in terms of 2 out of 3 safety measures--drugs and theft--they were also more likely to have experienced unfavorable change. Compared to females, males were more likely to experience an increase since eighth grade in the number of times they had something stolen, were approached to purchase drugs, and were threatened with physical harm.

Though students of different races and ethnicities experienced change on all three school crime measures (thefts, threats of physical harm, and drug sales) in the same direction as the eighth grade cohort overall, the sheer numbers (or percentages) of students who experienced a particular change varied by race/ethnicity and school crime behavior. The variation of experiences, however, indicated no discernable pattern; that is, one ethnic or racial group did not appear to be experiencing more or fewer acts of school crime in high school relative to eighth grade than another ethnic or racial groups. One difference is worth noting, however. White students were more likely than black students to experience an increase since eighth grade in the frequency with which they were approached to purchase drugs. Fifteen percent of white students reported more encounters with drug pushers in high school than in eighth grade, compared to 10 percent of black students.

Change in school crime was also experienced differently by students who scored in the highest and lowest test quartiles on the NELS:88 base year cognitive test. As shown in Table 3.3, both increases (as measured by the frequency of someone offering to sell the respondent drugs) and decreases (as measured by the frequency of personal thefts experienced at school) in school crime were felt more by students

scoring in the lowest cognitive test quartile in the base year (1988). Although in terms of practical significance the difference is not substantial, low-quartile students were significantly more likely (27%) than high-quartile students (24%) to have experienced fewer thefts in high school than in eighth grade (an improvement in safety), and more likely (14%) than high quartile students (12%) to have been approached more times to buy drugs in high school than in eighth grade (a deterioration of safety).

Of considerable interest is the pattern of differential change among students who changed school sectors. Although for the eighth grade cohort as a whole, when change was experienced, more students rather than fewer experienced decreases in threats of physical harm and thefts, for the 6 percent of the cohort who moved from a private sector eighth grade school to a public sector high school, the findings were reversed, suggesting a hierarchy of safety among schools. The general pattern of student responses reported in Table 3.3 suggest that regardless of sector type, high schools appear to be safer schools than eighth grade schools, and private schools appear to be safer than public schools.

In keeping with the literature on sector differences, the learning environments of students who changed from a public eighth grade school to a private high school, in terms of thefts and threats, were altered for the better. The reverse was encountered by students who changed from a private eighth grade school to a public high school. These students encountered a dramatic change for the worse in terms of drug sales. Students who did not change sectors, but who nonetheless experienced a change, also encountered increases in offers to buy drugs.

Both students who changed from a private eighth grade school to a public high school and students who remained within the same school sector between eighth grade and high school experienced more thefts in high school than students who switched from a public eighth grade school to a private high school. Nearly a quarter (23%) of private to public change students and no change students (21%) experienced an increase in thefts, whereas 10 percent of public to private change students experienced an increase. Similarly, private to public change students and no change students were considerably more likely than public to private change students to experience greater frequency of being approached to buy drugs in high school relative to eighth grade. As shown in Table 3.3, 19 percent of private to public school change students and 15 percent of no change students encountered an increase since eighth grade in the number of times they were approached to buy drugs, whereas 6 percent of students who changed to a private school encountered this unfavorable direction of change. Finally, private to public change students were less likely than both no change students and students who changed from a public eighth grade school to a private high school to experience fewer threats of physical harm. Eleven percent of private to public change students compared to 28 percent of public to private change and 18 percent of no change students reported a drop in threats of physical harm in high school relative to eighth grade.

Perceptual Measures of School Safety

In the base year and first follow-up, students were also asked their perceptions of their schools' safety. Specifically, students were asked whether they "strongly agreed", "agreed", "disagreed", or "strongly disagreed" with the statement "I don't feel safe at my school." Change scores were constructed by collapsing the categories "strongly agree" and "agree" into one "agree" category, and similarly, by collapsing "disagree" and "strongly disagree" into a single "disagree" category, and subtracting one observation from another.

Overall change and the direction of change. Students' overall perceptions of safety support the findings reported above. These data suggest, again, that high schools are safer than eighth grade schools.

As presented in Table 3.5, which reports overall change and differential change by selected background characteristics, more students reported feeling safe in high school, whereas previously they felt unsafe, than reported feeling unsafe in their 1990 school after feeling safe in their 1988 school. Based on individual change scores, 85 percent of 1988 eighth graders reported they felt as safe (or unsafe) in their new high school, the same as they did in their eighth grade school, 9 percent reported they now felt safe in school, whereas previously they felt unsafe, and 6 percent encountered the reverse situation--they now felt unsafe in school, whereas previously they felt safe.

Data presented in Table 3.6, which compares students' base year perceptions of safety to students' first follow-up perceptions, reflect the same finding: students feel safer in high school than in eighth grade. These data also show, however, that almost 1 out of 12 (8.3%) students still find school unsafe.

Subgroup differential change. While, overall, more students were more likely to experience moving into a safer school environment than a less safe one, this favorable change was experienced differently by some subgroups. Though males (10%) and females (8%) were about equally likely to experience a safer than a less safe high school environment, differences were observed among racial and ethnic subgroups, SES subgroups, test achievement subgroups, and groups of students who changed to high schools that were of a different sector than their eighth grade school.

Table 3.5 **Percentages of 1988 eighth graders in 1990 reporting they now agree or disagree (changed from opposite view held in 1988) with the following statement by selected background characteristics**

	R doesn't feel safe at this school		
	Same	Change to disagree (now feels safe)	Change to agree (now feels unsafe)
Total	85.2	8.7	5.9
Sex			
Male	84.0	9.7	6.4
Female	86.5	8.0	5.5
Race/Ethnicity			
API	83.5	9.8	6.7
Hispanic	81.4	10.8	7.8
Black	75.4	15.4	9.2
White	87.7	7.2	5.1
American Indian	79.6	17.1	3.3
BY SES Quartile			
Lowest	81.1	11.5	7.4
Second Lowest	82.2	10.9	7.0
Second Highest	85.9	8.4	5.7
Highest	90.3	5.6	4.1
BY Test Quartile			
Lowest	76.1	15.4	8.6
Second Lowest	83.9	9.1	7.1
Second Highest	87.1	7.8	5.1
Highest	91.8	4.5	3.8
School Change			
Public to Private	84.7	12.1	3.2
Private to Public	88.0	5.1	7.0
No Change	85.1	9.0	5.9

NOTE: Due to rounding, numbers may not sum to 100.0 percent.

SOURCE: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Table 3.6 **Percentages of students reporting they agree with the following statement about their eighth grade (1988) and first follow-up (1990) schools by selected background characteristics**

	R doesn't feel safe at this school	
	1988	1990
Total	11.5	8.3
Sex		
Male	12.3	9.1
Female	10.7	7.5
Race/Ethnicity		
API	12.2	9.1
Hispanic	14.7	10.7
Black	19.1	13.0
White	9.4	6.9
American Indian	20.8	8.4
BY SES Quartile		
Lowest	16.0	10.9
Second Lowest	13.9	9.5
Second Highest	10.4	8.0
Highest	6.9	5.5
BY Test Quartile		
Lowest	19.6	12.6
Second Lowest	12.0	9.7
Second Highest	10.4	7.1
Highest	5.4	4.7

SOURCE: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

As shown in Table 3.5, Hispanic students (11%) were more likely than white students (7%) to perceive a change to a safer school environment. The change in safety perceived by black students was more complicated: owing to the overall numbers of blacks who perceived a change, blacks were both more likely to have perceived favorable change than whites and less likely to have perceived favorable change than whites and American Indians. While blacks were twice (15%) as likely as whites (7%) to perceive a change to a safer environment, they were also almost twice (9%) as likely to perceive a change to a less safe environment than both whites (5%) and American Indians (3%).

Between lowest and highest SES quartile students and lowest and highest base year test quartile students, the pattern of change is similar. Low-SES students were twice (12%) as likely as high-SES students (6%) to report in 1990 they felt safe at school, when previously, in 1988, they felt unsafe. Similarly, low test quartile students were three times (15%) as likely as high quartile students (5%) to feel safe in high school (when previously they felt unsafe in eighth grade).

Finally, in partial support of the results reported above on school crime, private to public change students were more likely to perceive their new high school as less safe than their eighth grade school than no change students. Nine percent of no change students in 1990 reported they felt safe in high school, whereas previously they did not, compared to 5 percent of private to public change students who perceived a change in safety in this direction. No other significant differences were found.

School Crime and Perceptions of Safety: Summary

The NELS:88 data show that, in terms of both behavioral accounts of school crime (with the exception of the "victimless" crime of drug solicitation) and students' perception of safety, high schools appeared to be safer than eighth grade schools. Given increasing media and press reports on the presence of weapons in schools and the dramatic increase in teenage death by firearms,[18] this finding may seem somewhat counterintuitive. It must be said, however, that NELS:88 did not measure more serious acts of school crime than theft, threats of physical harm, and drug sales; and, a decrease in thefts and threats does not rule out the possibility that students were indeed experiencing more serious acts of crime in high school than in eighth grade. However, students reported that they perceived high school to be safer than their eighth grade school. Unlike the behavioral school crime measures, students' perceptions of safety were not bounded to particular degrees of seriousness or acts of school crime, but could reflect any act they perceived as unsafe.

However, the NELS:88 finding that high schools, as measured here, are safer than eighth grade schools may not be so surprising. A review of the literature at the time, reported in the Safe Schools Study (1978), repeatedly showed this same NELS:88 pattern of students' behavioral accounts of school crime, particularly thefts and threats of physical harm, decreasing as students became older and moved into the later grades. The Safe Schools Study (1978), which investigated the seriousness of school violence and crime over the academic years 1976 and 1977, also found fewer incidences of thefts, threats, and fights occurring in secondary school than in elementary school. Upon further examination of the data, the authors of the report suggested that the decrease may be related to a number of different factors among

[18] The dramatic rise in teenage death by firearms since 1985 suggests that teenagers are increasingly able to obtain and willing to use firearms. According to a study conducted by the National Center for Health Statistics, between 1985 and 1990, the incidence of firearm deaths (including murder, suicide, and accident) increased 77 percent from 13 deaths per 100,000 teenagers in 1985 to 24 deaths per 100,000 teenagers in 1990.

them: students' "learning the ropes" of their school, or the integration of younger, more emotionally expressive students with older students.

Overall School Climate

Thirteen items were used in the base year and first follow-up to measure students' perceptions of overall school climate. The items, on school discipline, teacher-student relationships, teacher behavior and instruction, student behavior, and school spirit, were developed to capture aspects of a school's atmosphere reported in the literature as essential for creating an engaging environment and a sense of belonging to the school on the part of students. Specifically, these aspects are warm teacher-student relationships, just and effective discipline, civility, school spirit, safety, shared experiences (i.e., common curricula), and high academic demand. For this analysis, we examined the seven positive-response climate items; that is, if students agreed with the statement about their school, it indicated a favorable view of their schools' climate with respect to the particular dimension. Both in the base year and first follow-up, students were asked to report "how much do you agree or disagree with the following statements about your current school and teachers?", and could answer "strongly agree", "agree", "disagree" and "strongly disagree."[19] The seven measures examined are:

- Students get along well with their teachers",
- "There is real school spirit",
- "Discipline is fair",
- "Teaching is good",
- "Teachers are interested in students",
- "Teachers praise my effort", and
- "Most teachers listen to what I have to say."

Also, for this analysis change scores were calculated and base year aggregate percentages were compared to first follow-up aggregate percentages. The results of the change score analysis by selected background characteristics are presented in Table 3.7, and the comparison of the proportion of students who agreed with each statement in the base year by the proportion who agreed with each statement in the first follow-up is presented in Table 3.8.

[19] Change was assessed by collapsing "strongly agree" and "agree" responses and "disagree" and "strongly disagree" responses together and subtracting the first follow-up dichotomous measure from the base year dichotomous measure. For this analysis, change refers to changes between "strongly agree or agree" and "strongly disagree or disagree" or vice versa. Change between "agree" and "strongly agree" or between "disagree" and "strongly disagree" are not considered indications of school climate changes.

Table 3.7 **Percentages of 1988 eighth graders in 1990 reporting they now agree or disagree (changed from opposite view held in 1988) with the following statements by selected background characteristics**

	Students get along well with teachers			There is real school spirit			Discipline is fair			The teaching is good at the school		
	same	change to disagree	change to agree	same	change to disagree	change to agree	same	change to disagree	change to agree	same	change to disagree	change to agree
Total	67.3	12.8	19.9	65.8	15.2	18.4	64.6	17.6	17.8	76.2	11.5	12.4
Sex												
Male	67.0	13.2	19.8	65.4	15.2	19.4	64.3	17.4	18.3	74.9	12.3	12.8
Female	67.6	12.4	20.0	66.2	16.4	17.3	64.9	17.8	17.2	77.4	10.7	11.9
Race/Ethnicity												
API	71.2	9.4	19.4	64.1	17.6	18.3	79.6	14.6	15.8	78.9	9.2	11.9
Hispanic	66.4	14.1	19.5	62.9	17.7	19.5	63.7	16.3	20.0	77.9	9.9	12.2
Black	58.0	19.2	22.8	64.6	15.6	19.9	58.5	21.6	19.9	75.7	10.9	13.4
White	69.1	11.5	19.4	66.5	15.6	18.0	65.7	17.3	17.0	75.8	11.9	12.3
Am. Indian	66.1	15.2	18.7	67.4	13.9	18.7	60.0	19.7	20.3	77.4	13.8	8.8
BY SES Quartile												
Lowest	64.9	16.1	19.0	66.2	15.2	17.6	62.8	19.6	17.7	76.2	10.3	13.6
Second Lowest	65.7	13.9	20.4	67.7	14.5	17.8	62.5	18.1	19.4	76.5	11.6	11.9
Second Highest	66.0	13.2	20.8	64.8	17.0	18.2	65.7	18.1	16.2	74.8	13.6	11.6
Highest	71.9	8.9	18.3	64.9	16.3	18.9	66.9	15.4	17.8	77.2	10.2	12.7
BY Test Quartile												
Lowest	61.8	17.0	21.2	67.7	14.2	18.2	59.1	19.3	21.6	69.3	13.5	17.2
Second Lowest	64.4	13.9	21.7	64.1	15.4	20.5	60.9	19.5	19.6	76.5	12.5	11.1
Second Highest	68.4	11.9	19.7	68.2	15.6	16.2	66.4	17.1	16.5	77.5	9.8	12.7
Highest	73.7	8.1	18.3	63.9	17.3	18.8	70.0	14.9	15.1	79.9	10.4	9.7
School Change												
Public to Private	77.0	1.8	21.2	70.3	5.7	24.1	71.7	11.2	17.1	71.4	4.7	23.8
Private to Public	68.7	18.0	13.3	63.5	16.0	20.6	58.8	14.6	26.6	78.5	11.6	9.9
No Change	67.2	12.6	20.2	65.9	15.9	18.2	64.9	17.8	17.3	76.0	11.7	12.3

NOTE: Due to rounding, numbers may not sum to 100.0 percent.

SOURCE: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Table 3.7 **Percentages of 1988 eighth graders in 1990 reporting they now agree or disagree (changed from opposite view held in 1988) with the following statements by selected background characteristics (cont'd)**

	Teachers are interested in students			Teachers praise effort			Most teachers listen to R		
	same	change to disagree	change to agree	same	change to disagree	change to agree	same	change to disagree	change to agree
Total	72.0	13.8	14.4	63.5	21.3	15.2	68.1	15.0	16.9
Sex									
Male	71.9	14.3	13.8	63.5	21.7	14.8	67.0	15.5	17.5
Female	71.7	13.4	14.9	63.5	20.9	15.6	69.2	14.5	16.3
Race/Ethnicity									
API	74.4	11.8	13.7	68.1	18.9	13.0	66.9	19.0	14.1
Hispanic	72.2	14.4	13.4	65.5	19.4	15.1	66.7	15.5	17.8
Black	71.5	13.3	15.2	66.0	18.9	15.1	70.6	13.0	16.4
White	71.7	14.0	14.3	62.7	22.1	15.2	68.0	15.1	16.9
Am. Indian	71.0	8.0	19.9	54.8	23.4	21.9	64.0	12.8	23.2
BY SES Quartile									
Lowest	70.3	14.3	15.3	64.6	20.0	15.4	65.8	15.8	18.4
Second Lowest	71.8	14.2	14.0	62.8	22.7	14.5	67.7	14.7	17.7
Second Highest	71.2	14.9	13.9	62.5	21.8	15.8	67.8	16.6	15.6
Highest	73.4	12.1	14.5	64.3	20.5	15.2	70.5	13.2	16.3
BY Test Quartile									
Lowest	65.7	16.3	18.0	63.0	21.7	15.4	63.1	16.3	20.6
Second Lowest	70.9	14.4	14.8	62.6	21.9	15.5	67.5	15.5	17.0
Second Highest	72.4	13.1	14.5	63.2	21.2	15.6	69.2	14.5	16.3
Highest	76.9	11.4	11.6	65.9	19.8	14.3	71.5	13.7	14.9
School Change									
Public to Private	73.2	6.3	20.4	58.8	17.1	24.1	72.0	7.3	20.7
Private to Public	75.7	13.7	10.6	64.8	23.0	12.2	77.2	13.7	9.1
No Change	71.6	13.9	14.5	63.6	21.3	15.2	67.5	15.2	17.3

NOTE: Due to rounding, numbers may not sum to 100.0 percent.

SOURCE: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Table 3.8 **Percentages of 1988 eighth graders in 1990 who reported they agreed or strongly agreed with the following statements about their 1988 eighth grade school and their 1990 school**

	Students get along well with teachers		There is real school spirit		Discipline is fair		Teaching is good	
	1988	1990	1988	1990	1988	1990	1988	1990
Total	67.5	74.9	67.7	70.6	69.6	69.8	81.3	82.2
Sex								
Male	68.5	74.6	69.1	71.7	68.8	68.9	80.2	80.3
Female	67.5	75.5	69.7	69.4	71.4	71.0	82.7	83.6
Race/Ethnicity								
API	75.7	84.6	69.0	66.8	75.3	76.4	84.4	85.1
Hispanic	66.6	73.2	65.6	67.0	69.7	73.1	82.8	85.1
Black	60.2	63.5	64.8	68.9	66.2	63.5	80.9	82.9
White	69.1	76.8	70.8	71.5	70.7	70.3	81.2	81.3
American Indian	70.8	74.9	62.5	67.2	67.0	69.6	83.6	78.7
BY SES Quartile								
Lowest	64.9	68.4	67.4	69.8	67.3	65.5	80.1	82.7
Second Lowest	66.1	72.7	71.0	72.5	67.9	68.3	80.4	80.6
Second Highest	67.2	74.9	69.4	69.5	71.2	69.9	81.7	79.7
Highest	72.8	82.5	69.4	70.4	73.2	74.9	83.2	84.7
BY Test Quartile								
Lowest	61.1	65.7	68.2	71.5	63.0	64.9	75.0	78.0
Second Lowest	62.7	70.5	67.8	70.9	68.6	67.6	81.2	80.2
Second Highest	69.6	78.0	71.6	71.2	70.5	71.1	81.2	83.1
Highest	75.6	84.7	70.1	70.2	76.0	75.8	86.7	85.6

SOURCE: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Table 3.8 **Percentages of 1988 eighth graders in 1990 who reported they agreed or strongly agreed with the following statements about their eighth 1988 grade school and their 1990 school (cont'd)**

	Teachers are interested in students		Teachers praise effort		Most teachers listen to what R says	
	1988	1990	1988	1990	1988	1990
Total	75.3	75.9	62.4	56.7	68.2	70.2
Sex						
Male	75.0	74.5	62.4	55.5	66.3	68.1
Female	75.6	77.3	62.5	57.7	69.9	72.2
Race/Ethnicity						
API	79.1	81.0	71.9	65.3	75.6	70.8
Hispanic	78.4	77.5	67.9	63.2	70.8	73.4
Black	74.9	76.3	68.7	63.9	72.3	75.4
White	74.9	75.3	60.3	54.0	66.8	68.8
American Indian	68.7	79.7	58.9	58.0	61.6	72.2
BY SES Quartile						
Lowest	73.1	73.7	64.2	59.9	67.5	70.3
Second Lowest	75.1	74.8	62.1	54.1	66.6	69.9
Second Highest	74.3	73.8	60.8	55.1	67.5	66.7
Highest	78.2	80.6	63.2	58.0	70.6	73.5
BY Test Quartile						
Lowest	69.5	71.2	64.3	58.4	63.2	67.2
Second Lowest	73.0	73.4	61.2	54.5	67.3	68.8
Second Highest	74.9	76.5	59.5	54.2	67.9	70.4
Highest	81.7	81.7	64.6	59.8	72.3	73.6

SOURCE: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Overall change and the direction of change. The direction of change, for the eighth grade cohort overall and for selected subgroups for the seven dimensions of school climate, are presented in Table 3.7. An examination of the overall totals reveals no predominant pattern of change, indicating mixed experiences. For example, while more students now agreed that high school teachers got along with students and listened to them, they did not find high school teachers any more interested in them than eighth grade teachers. These results are found whether the data are analyzed by way of individual change scores or comparison of base year percentages to first follow-up percentages. Such patterns suggest school climates improved in some ways and deteriorated in others in the move from eighth grade to high school.

Overall, three favorable changes and one unfavorable change were observed on four of the seven climate dimensions. Of the dimensions showing significant directional change, more students (20%) reported a positive change to better teacher-student relationships in high school over eighth grade than a negative change (13%); similarly, more students (17%) felt high school teachers listened to them, whereas in eighth grade they did not, than reported, in direct opposition to their experiences in eighth grade, that high school teachers did not listen to them (15%). More students (18%) also reported a favorable change from perceiving their eighth grade school as having no real school spirit to perceiving real school spirit in high school, than reported the inverse (15%). Finally, more students reported that high school teachers were less likely than eighth grade teachers to praise their efforts; over 20 percent of students perceived a drop in praise, while 15 percent perceived an increase in praise from eighth grade to high school.

Subgroup differential change. Overall, it appears that students experienced few discontinuities in their learning environment in the move from eighth grade to high school. Nevertheless, there were some subgroup differences, primarily in terms of the proportion of students from different subgroups who perceived a change overall (i.e., stayed the same since eighth grade) rather than in the direction change was perceived--when change was perceived it was in the direction of a better school environment. One subgroup difference not observed was a difference between the sexes. Across all climate measures, males and females did not differ significantly in terms of perceiving a change overall between their eighth grade school and high school or in the direction this change took.

A positive change in teacher-student relations, that is, moving from the belief in eighth grade that teachers did not get along with students to the belief that, in high school, they do, was experienced equally among all racial and ethnic groups. However, negative change was not. Black students were almost twice as likely (19%) as Asian (9%) and white (12%) students to perceive a change to poorer teacher-student relationships in high school.

Relative to students in the highest SES quartile, students in the lowest quartile perceived a decline in their learning environment in terms of teacher-student relationships, teacher listening, and fairness of discipline. Low-SES students were twice as likely (16%) as high-SES students (9%) to have altered their assessment of teacher-student relationships from good in eighth grade to bad in high school. Though not as large as the differential on the climate dimension of teacher-student relationships, but still significant, one out of five (20%) low-SES students reported a change from fair to unfair disciplinary tactics, whereas 15 percent of high-SES students reported this direction of change. Similarly, 16 percent of low-SES students compared to 13 percent of high-SES students perceived a decline in teacher listening.

Highly correlated with SES is academic achievement, which is measured here by performance on the base year cognitive test. Here, the pattern of differential change exhibited by low and high-SES students is repeated, and, interestingly elaborated upon, by students scoring in the lowest and highest quartiles on the base year cognitive test. What is surprising is that, while low test quartile students were

twice as likely (17%) as high test quartile students (8%) to express a negative change in teacher-student relationships, they perceived the quality of instruction, as represented by teaching in general and teacher listening, as improving. As shown in Table 3.7, 17 percent of low quartile students perceived a change to good teaching in high school, compared to 10 percent of high quartile students who perceived a change in this direction. In terms of teacher listening, 21 percent of low quartile students thought high school teachers were better listeners than eighth grade teachers, compared to 15 percent of high quartile students.

Students who also changed school sectors experienced few discontinuities in learning environment; only one dimension registered significant change among students who changed school sectors. As shown in Table 3.7, public to private change students were less likely than both no change and private to public change students to feel their new school did not have real school spirit. Sixteen percent of both no change and private to public change students perceived a deterioration in school spirit in the move from eighth grade to high school, compared to just 6 percent of public to private change students.

Summary: Overall School Climate

The findings on overall school climate suggest that a student's high school environment is marginally more conducive to learning than the eighth grade school environment. That is to say, the environments of students' secondary schools and intermediate schools, with respect to such factors as teacher-student relations, teaching quality and school discipline, varied little, and in fact, for a sizable minority of students, both their eighth grade school and high school experiences were characterized by uncaring and poor teachers, unfair discipline, no real school spirit, and unsafe conditions. As presented in Table 3.8 (by subtracting the proportion of students who agreed with each climate dimension from 100), 30 percent of eighth graders perceived their 1988 and 1990 schools as administering unfair discipline; approximately a quarter felt teachers did not get along well with students; approximately 30 percent thought that their schools lacked school spirit; about 20 percent did not believe the teaching at their schools was good; 24 percent believed teachers were not interested in students; about one out of three found that teachers did not listen to them; and close to 1 out of 11 students (8%) still felt unsafe in school (from Table 3.6).

While school environment items have been reported only for individuals who were in school in the spring of 1990, information was gathered on family life changes for all members of the eighth grade cohort; that is, for both students and dropouts. This chapter ends with a summary of the ways in which eighth grade cohort members' home and family life changed between 1988 and 1990.

Family and Home Life Changes

A change in schools is only one of several transitions adolescents may undergo between eighth grade and high school. While almost all adolescents undergo some kind of school change at this juncture, not all important changes are necessarily regularized or universal. For example, students may experience social, family, and home-life changes concurrently or contiguously with the transition to a new school, changes which may potentially influence students' academic performance. This section considers some non-school related events or family occurrences that took place in the lives of the 1988 eighth grade class (including both those who did and did not drop out by 1990) between the spring of 1988 and the spring of 1990.

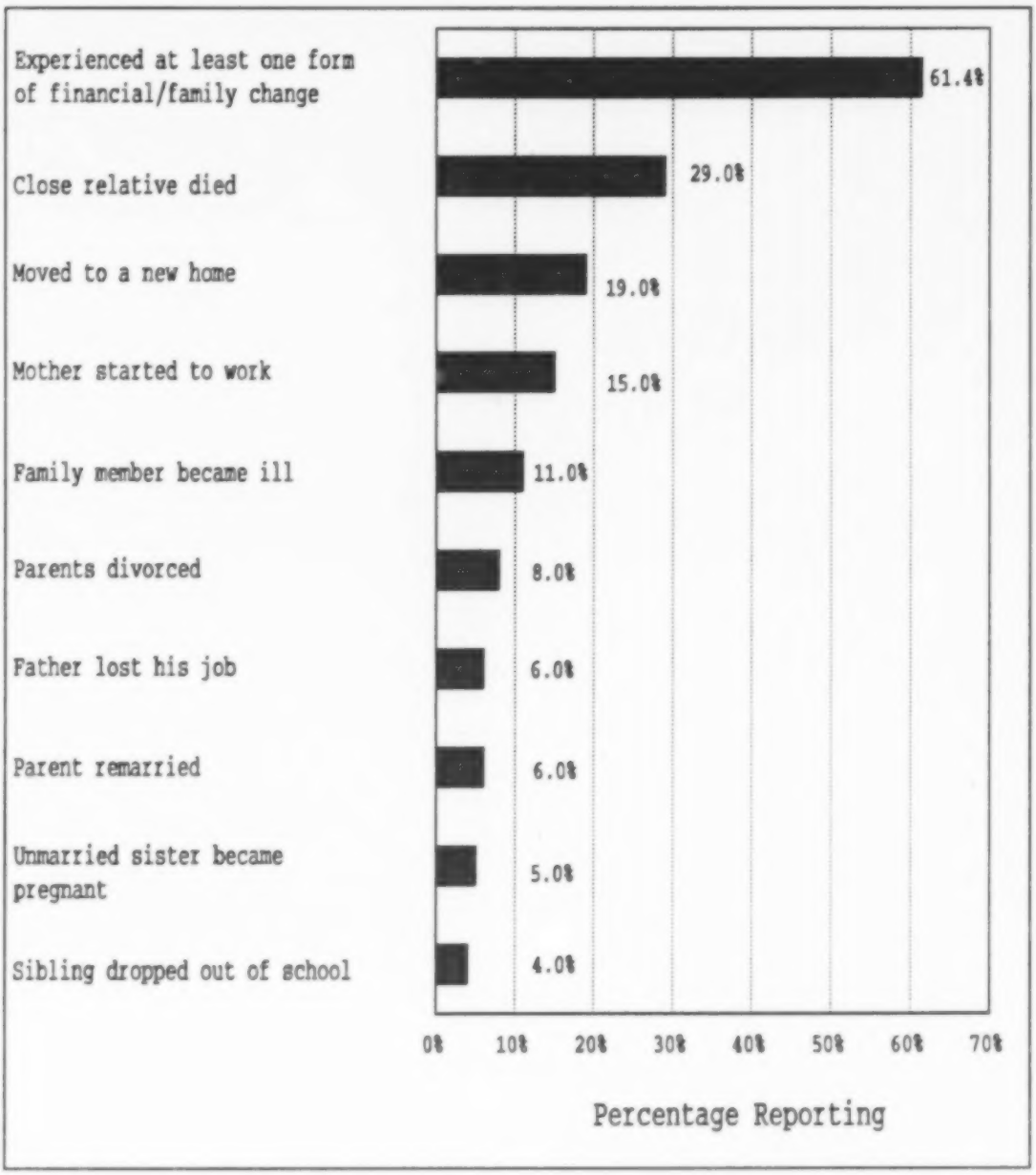
One of the questions in the first follow-up student questionnaire asked students to report if any of 18 specific "life events" happened to their families over the course of "the last 2 years" (between the

spring of 1988 and 1990). The majority of events listed (13 responses) were negative (that is, potentially disruptive), such as "my father lost his job" or "a close relative died", two may be considered strictly positive (i.e., "my father started to work" and "my family went off welfare") and the remaining three may be viewed as having either positive or negative implications (i.e., "my family moved to a new home"; "one of my parents got married"; "my mother started to work"). Figure 3.4 shows the ten most frequently reported events.

Over six in ten (61%) 1988 eighth graders experienced at least one form of family and/or financial change since they left eighth grade in 1988, although a maximum of 30 percent experienced any one of these events. The most frequently reported event was the death of a close relative with nearly three in ten (29%) respondents reporting this event. Moving to a new home was another frequently occurring event; close to one out of five 1988 eighth graders (19%) moved between 1988 and 1990. The advancement to a new school for high school has traditionally been seen by families as an ideal time to move, so that for some students the change to a new home was experienced concurrently or contiguously with change to a new school. Indeed, perhaps, as many as 20 percent of 1988 eighth graders were adjusting to a new school without the support of old friends from elementary or intermediate school. Over the two year time period between 1988 and 1990, two out of twenty-five (8%) 1988 eighth graders' parents got divorced, while the average national divorce rate for 1989 was 8 percent. Other family changes included the remarriage of a parent (6%), pregnancy of an unmarried sister (5%), and a brother or sister dropping out of school (4%). Although 15 percent of 1988 eighth graders' mothers started to work during this period--on the one hand, potentially increasing students' standard of living and on the other, potentially decreasing emotional support and involvement in school--6 percent of eighth graders' fathers lost their jobs, which is a rate slightly higher than the national average for males in this age group (25-44 years old) during this period (4%).[20]

[20] *Statistical Abstract of the U.S. 1991*. U.S. Department of Commerce, Economics & Statistics Administration, Bureau of the Census.

Figure 3.4
Percentages of 1988 eighth graders in 1990 who reported the following events happened in their lives between 1988 and 1990 (ten most frequently reported events)



SOURCE: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Chapter Summary

The findings reported in this chapter provide an overview of the nature of school and family changes that students undergo between eighth grade and high school.

Transitions to High School

A Typology of Sector Change

- One of the most dramatic changes almost universally experienced by 1988 eighth graders was the change to a new school building for high school--89 percent of the 1988 eighth grade cohort changed to a new school for high school.

- A substantially smaller proportion of students, however, experience school change in the form of attending a different sector school. Overall, just 7 percent of the class of 1988 attended high school in a sector that was different from their eighth grade school.

- While the overall magnitude of sector change was small, among those students who did change sectors, the majority moved from a private eighth grade school to a public high school; two-thirds (66%) of private school eighth graders who changed to a different type of school (public; Catholic; NAIS or other private) for high school, changed to a public school.

Changes in Student's Learning Environment

With the transition to a new school building for high school, there is typically a change in learning environment. In the first year of high school, students perceived substantial environmental differences between their previous eighth grade school and new high school.

- As measured by the proportion of students who agreed that high school coursework was more difficult than the year before (73%), high schools were perceived to be substantially more challenging academically than eighth grade schools.

- By 1990, however, most students were enrolled in their second year of high school, and somewhat contrary to students' perceptions about the difficulty of first year high school coursework relative to the year before, slightly more than one-half of the eighth grade cohort spent the same amount of time doing more homework in high school as they did in eighth grade.

- Females, Asians, students in the highest SES quartile and those scoring in the highest quartile on the base year cognitive test were more likely to have increased the time they spent on homework since eighth grade than other groups of students.

Regarding the safety of high school in terms of behavioral measures of school crime, while the frequency of thefts and threats of physical harm decreased in the move from eighth grade to high school, encounters with drug pushers rose.

- Slightly more than a quarter (26%) of the eighth grade class of 1988 reported that personal thefts occurred fewer times in high school than in eighth grade, whereas 21 percent reported that thefts occurred more times,

- In intermediate, middle or junior high school in 1988, 9 percent of the eighth grade cohort was approached to buy drugs at least once; two years later, however, encounters with drug pushers had nearly doubled to 18 percent, and

- For members of the eighth grade cohort who moved from a private sector eighth grade school to a public sector high school, some of these findings were reversed--decreases in thefts and threats were less likely to occur--suggesting a hierarchy of safety among schools.

In terms of students' perceptions of safety,

- Students were more likely to perceive their new school as safer than their eighth grade school; overall, 9 percent of 1988 eighth graders perceived their new school to be safe when previously they felt unsafe in eighth grade, compared to 6 percent of 1988 eighth graders who perceived their new school as unsafe when previously they felt safe in eighth grade.

Differences were also observed between eighth grade and high school learning environments, on other measures of school climate, though the lack of a strong pattern suggests that students experienced few discontinuities between eighth grade and high school. Some noteworthy findings are:

- Overall, students experienced a change to better student-teacher relationships, better teacher listening, and more school spirit, in the move from eighth grade to high school,

- However, blacks were almost twice as likely (19%) as Asian (9%) and white (12%) students to perceive a change to poorer teacher-student relationships in high school.

Family Transitions

Not all transitions that students undergo are normal and/or routine for a certain age or stage. Students may also experience change in family structure and home environment. Overall, more than six in ten (61%) NELS eighth graders experienced at least one important family change, with the death of a close relative being the most frequently reported family-life event (29%). Some major life events experienced during the two year period between 1988 and 1990, as the majority of the eighth grade cohort moved to a new school for high school were: moving to a new home (19%), mothers entering the work force (15%), a family member becoming seriously ill or disabled (11%), and a brother or sister dropping out of school (4%).

In the next chapter, our investigation of student change continues with an examination of the questions by how much and in what way did the eighth grade class of 1988 cognitively grow between the spring of 1988 and the spring of 1990.

Chapter 4: Student Growth in Cognitive Skills

Members of the 1988 eighth grade cohort were given cognitive tests in mathematics, reading comprehension, science and history/citizenship/geography as eighth graders in 1988, and again in 1990 when the majority of the eighth grade cohort was in tenth grade. The 1990 tests were modifications of those given in 1988 and were equated so that scores for both years were on the same scale. This chapter considers gains in cognitive test scores during the two year time interval for members of the eighth grade cohort who remained in school, whether or not they were tenth graders in 1990; dropouts are not included. Two types of score gains are considered. The first type, gains in total scale scores, or **simple gain scores,** measure improvement in performance on each subject area test as a whole. The second type, **proficiency scores**, estimate the probability of each student having mastered sets of skills marked by clusters of test items at different levels of difficulty.[1]

It is important to note that the results reported in this chapter are limited to describing the status and gains in achievement made by subgroups of students defined in various ways. Individual student attributes, family circumstances, characteristics of the school setting and of society at large all interact to affect student achievement. Any attempt to address the complex interaction of these factors and to infer causality to any of them was not intended, and is beyond the scope of the descriptive statistics reported here.

The simple gain scores are estimates of the total number of items each student would have answered correctly on the equated pool of test items in each subject area. That is, they are the simple difference between a student's 1990 mathematics scale score, for example, and his/her eighth grade mathematics scale score two years earlier. Such scores document the extent, or quantity, of cognitive growth, but not its nature, that is, the location on the growth curve where learning took place. The amount of growth, in terms of incremental gains in points on the test score scale, provides summary information that tells only part of the story of cognitive development. Comparing groups on raw gains alone can lead to serious misinterpretations in that two or more subpopulations may have the same raw score gains, but the gains may be occurring at quite different points along the scale. For example, one group could be gaining five points at the upper end of the test score scale while another group may be showing the same amount of gain (in terms of raw score points), but at the lower end of the scale. While both groups appear to be growing at the same rate given equivalent raw score gains, they are likely to be exhibiting skill gains in qualitatively different areas. Therefore, it is desirable to look not only at the amount of gain, but also to take into consideration where on the test score scale the gain took place.

The reporting of the second part of the cognitive-growth story, **qualitative** information about the score gains, is necessary if proper interpretations are to be made when comparing subpopulations. In the case of mathematics, gains at the upper end of the score scale correspond to increased proficiency in problem solving, while gains at the lower end indicate increased competence in carrying out simple arithmetic operations. These qualitatively different gains can be expressed in terms of changes over time in the proportions of students who have mastered different sets of skills. Clusters of items with similar content and difficulty were identified in the mathematics and reading comprehension tests. Four such

[1] A description of the test specifications can be found in Appendix B, and more detail on scores and equating procedures in the *NELS:88 First Follow-up Final Technical Report* (Ingels, et al., 1994). It should be noted that the following results are dependent on the content and difficulty of items selected for the various assessment measures. While the tests were designed to represent what was being taught in the ninth and tenth grade curriculum at the time, different choices of test content would have yielded different results.

levels were defined by clusters of mathematics items of similar content and difficulty, while two levels were identified in the reading comprehension test. Passing or failing particular clusters of items defines the level at which students are. The term proficiency score will be used here to indicate students' mastery of a particular level of mathematics or reading skills. The scores are estimates of the **probability** that each student had mastered a certain set of skills by passing (getting at least three out of four right) the cluster of items that represent skills indicative of a particular difficulty level. These probabilities are IRT-based, that is, they are based on ability as demonstrated by performance on the test as a whole. Thus, it is possible to calculate an estimate of probability of proficiency at the highest math level for 1988 eighth graders in 1990, based on their overall test performance, even though the highest level mathematics items were not included in the eighth grade test form.

The skill levels in reading and mathematics follow a building block pattern. The skills required to master the basic level are necessary to achieve proficiency at a higher level. For example, students proficient at the highest mathematics level (level 4) have also mastered the lower level skills: they can successfully carry out arithmetical operations on whole numbers (level 1); they can carry out simple operations on decimals, fractions, and roots (level 2); they can successfully solve simple problems requiring conceptual understanding, and/or development of a solution strategy (level 3); and in addition, individuals performing at level 4 can solve problems requiring complex conceptual understanding and/or development of complex solution strategies. Similarly, students at the highest level of reading proficiency (level 2) are proficient at level 1 simple reading comprehension including reproduction of detail and/or the author's main thought, and also have the ability to make inferences beyond the author's main thought and/or to understand and evaluate abstract concepts (level 2).

The following figures show average achievement for subgroups of students on tests taken in 1988, when they were eighth graders, and for the same students in 1990. The graphs are grouped by content areas, and within content areas by demographic and school-related variables. Cognitive gains in terms of changes in total scale scores (simple gains) are shown for all four subject areas. In addition, changes in proportions of students demonstrating mastery at each of the four proficiency levels in mathematics and the two proficiency levels in reading comprehension are presented for the same population subgroups. Appendix A contains tables of the score gains, means, standard deviations and standard errors for the subgroups shown in the figures; an adjustment for design effect was used in calculating the standard errors.

The line graphs show the mean scale scores for subgroups of students on the test as a whole. In each graph, two numbers are shown for each subgroup: the 1988 mean score, and the comparable mean in 1990 for the same students. In a majority of the graphs, the set of lines connecting the two time points for each subgroup look close to parallel. This indicates that the subgroups illustrated gained about the same number of scale score points in the two year time interval. The vertical distance between the lines shows that even though the relative gains over time were similar, the subgroups began and ended with very different average achievement scores. For example, Figure 4.1 shows average total scale scores in mathematics for four racial/ethnic groups in 1988 (eighth grade), and for the same students two years later (1990). While black and white students gained, on average, about the same number of scale score points during this time interval (5.08 vs. 5.16), the nearly 9-point gap in average performance between the groups remained close to constant. In some of the graphs, however, the lines had quite different slopes, meaning that the subgroups differed in the size of scale score gains as well as in initial achievement status.

Average probability scores for two levels of proficiency in reading and four in mathematics are shown in the bar graphs. The mean probability of proficiency, when aggregated over students within a

subgroup, is mathematically equivalent to an estimate of the proportion of students in the subgroup that mastered the skill. The height of the lower, lightly-shaded, section of each bar represents the mastery rate in eighth grade for each subgroup at each proficiency level. The size of the darkened upper section, as well as the numbers printed above the bars, indicate the change in this proportion between 1988 and 1990, that is, the additional students who achieved mastery during this time interval. For example, the first bar in Figure 4.2 shows that 90 percent of Asian students had mastered level 1 mathematics skills when they were tested in eighth grade (equivalent to an **average probability** of proficiency, aggregated over this group, of .90), and that this proportion had increased 3 percentage points by 1990. Inspection of the grade-eight bar heights for subgroups with small average proficiency gains as of 1990 suggests that small gains were related to high initial status. That is, in the case of the level 1 mathematics gains for the Asian students, the gains were small in 1990 because such a high proportion of students were already proficient in arithmetic skills in eighth grade (1988), leaving little room for growth at this level for most students. The graphs also demonstrate that when eighth grade status was lower, 1990 gains were not constrained by high initial mastery rates. The bar graphs can also provide an indication of whether disparities between subgroups increased or decreased over time. For example, in Figure 4.2, the level 1 discrepancies in bar heights are greater at eighth grade (the lightly shaded portions) than they were in 1990 (the composite level 1 bars including the dark sections). This shows that gaps in mastery rates decreased somewhat during the two years. For level 4 skills, however, differences in the total bar heights are **greater** than they were initially: that is, subgroup discrepancies at level 4 **increased** during this period.

Growth in Mathematics

The NELS:88 sample as a whole gained, on average, 5.17 total scale score points in mathematics in the two years following eighth grade, or just under half a standard deviation in base year units. The largest gains were taking place in the skills measured by proficiency levels 2 and 3: operations on decimals, fractions and roots, and simple problems requiring conceptual understanding and/or development of a solution strategies. Increases in average probability of proficiency of .16 and .18 for levels 2 and 3 are analogous to increases in the proportion (or percentage) of the population demonstrating mastery of these skills, that is, the proportion of the population demonstrating mastery increased from 47 percent to 63 percent and from 29 percent to 47 percent for the two levels, respectively. Considerably smaller gains were observed for level 1 arithmetic operations and for the more complex level 4 problem solving items. Most of the students (84%) were already proficient at arithmetic in grade eight; only 6 percent were added to this group by 1990. At the other end of the difficulty range, most students had still not achieved level 4 proficiency; the percentage who did so increased from 10 percent in 1988 to 21 percent in 1990. While the average gains in **total scale score** points were very similar for most of the population subgroups described below, patterns of gains in **probability of proficiency** in specific skills varied for different subgroups. Appendix A reports total scale score statistics for the total sample and subgroups and statistics for the four proficiency levels.

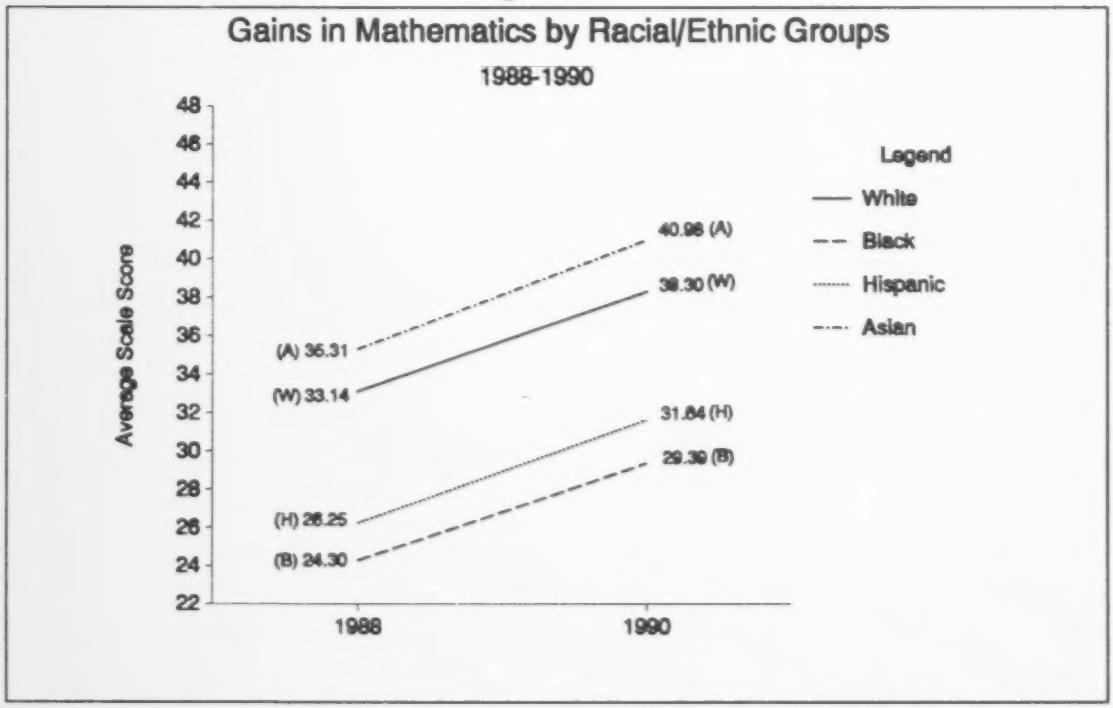
Figure 4.1 shows the 1988 and 1990 means for the four racial/ethnic groups, with a line connecting the pair of means for each of the groups. The lines are reasonably parallel, in other words, the discrepancies in average achievement among the racial/ethnic groups neither narrowed nor widened significantly in the two years following eighth grade.

Inspection of Figure 4.2 shows relatively small gains in level 1 arithmetic skills for white and Asian students, with increments of .04 and .03 over the proportions who had demonstrated mastery of this level in eighth grade (.87 and .90, respectively in the base year). Meanwhile, black students were making much larger average gains at this level, increasing .13 from .68 to .81; Hispanic sample members gained

.11, from .75 to .86. The racial/ethnic groups had similar gains for level 2 items, with 15 percent to 18 percent demonstrating mastery two years later; however, many more white and Asian students (53% and 60%) than black and Hispanic students (23% and 28%) were proficient initially. No substantial progress was made in narrowing the achievement gaps in level 2 skills during this time interval. For the higher level 3 and 4 skills, achievement gaps widened, significantly so for the complex problem solving level (level 4). While level 4 mastery rates at the time of the 1990 first follow-up did not reach 50 percent for any racial/ethnic group, white and Asian students showed comparatively greater growth in average probability of proficiency, .13 and .17 respectively, than did black and Hispanic students with gains of .04 and .07.

Figures 4.3 and 4.4 present the total test score gains and the gains at each proficiency level for the two gender groups. Unlike the racial/ethnic comparison above, both of these graphs tell the same story. That is, both male and female students show the same total scale score gains (Figure 4.3) as well as similar patterns of both initial status and gain across proficiency levels. Large changes (gains) in probabilities associated with any one proficiency level suggest that more learning took place with respect to the skills that define that particular level compared to levels with smaller gains. Figure 4.4 suggests that for both males and females, on average, most learning took place at levels 2 and 3.

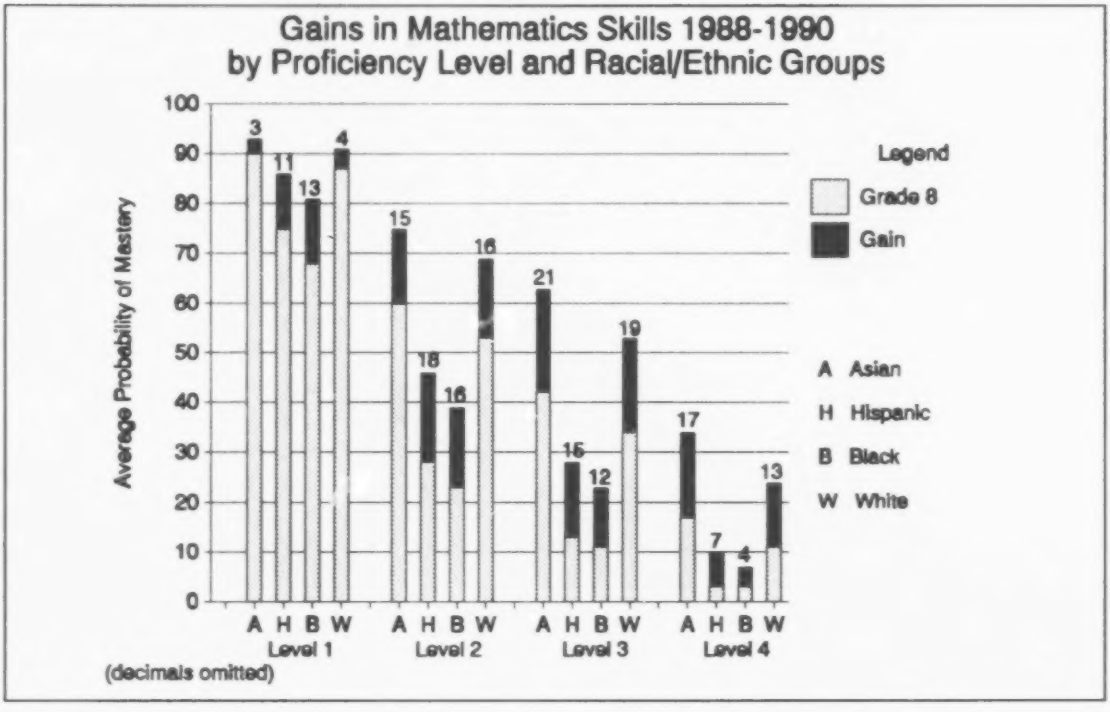
Figure 4.1



SOURCE: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

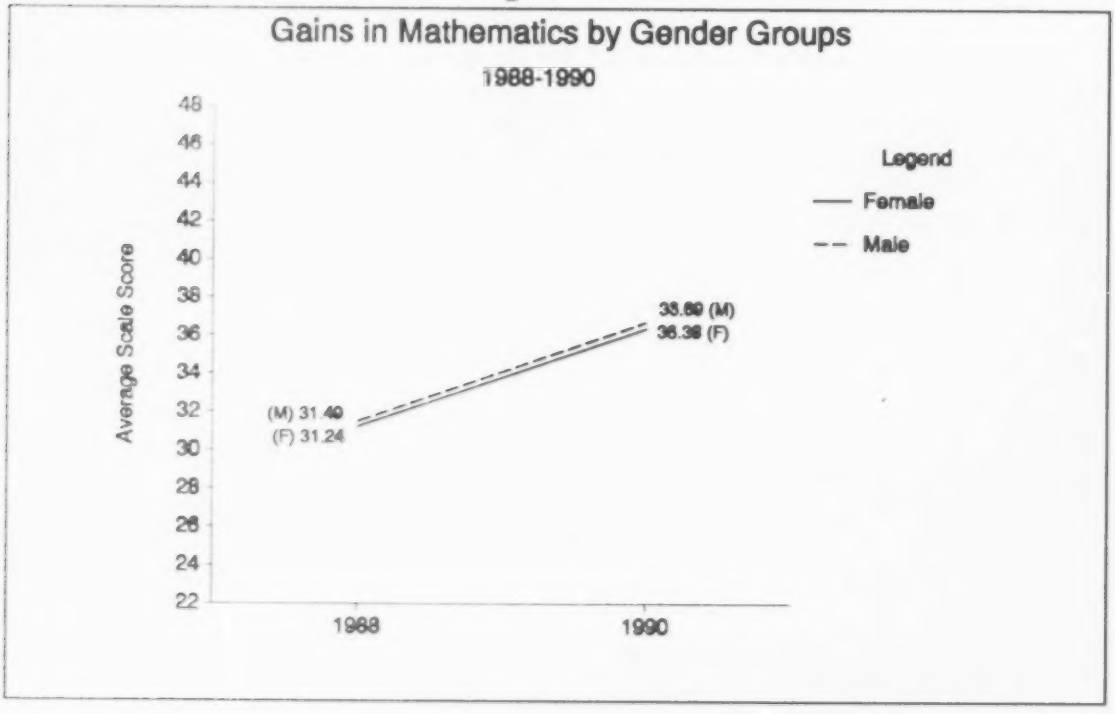
Figures 4.5 and 4.6 present cognitive gains socioeconomic status (SES) quartiles (SESQ1=lowest SES quartile, SESQ2=second lowest SES quartile, SESQ3=second highest SES quartile, SESQ4=highest SES quartile). Figure 4.5 shows total scale score mean gains of about five points for all SES quartiles. Figure 4.6 shows a narrowing of the gap in arithmetic skills (level 1) for the lowest SES quartile relative to the highest group. At the opposite end of the spectrum, the gap has widened, with more learning of level 4 mathematics skills (primarily conceptualizing and problem-solving skills) for the highest SES quartile than for the remaining three SES quartiles.

Figure 4.2



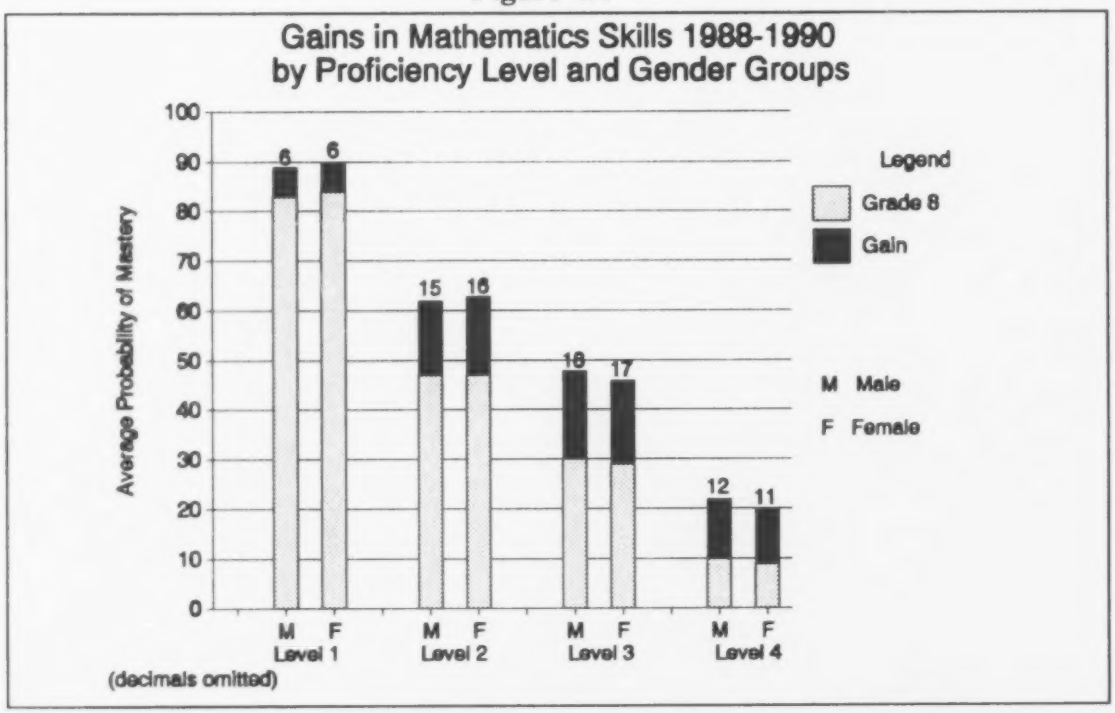
SOURCE: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Figure 4.3



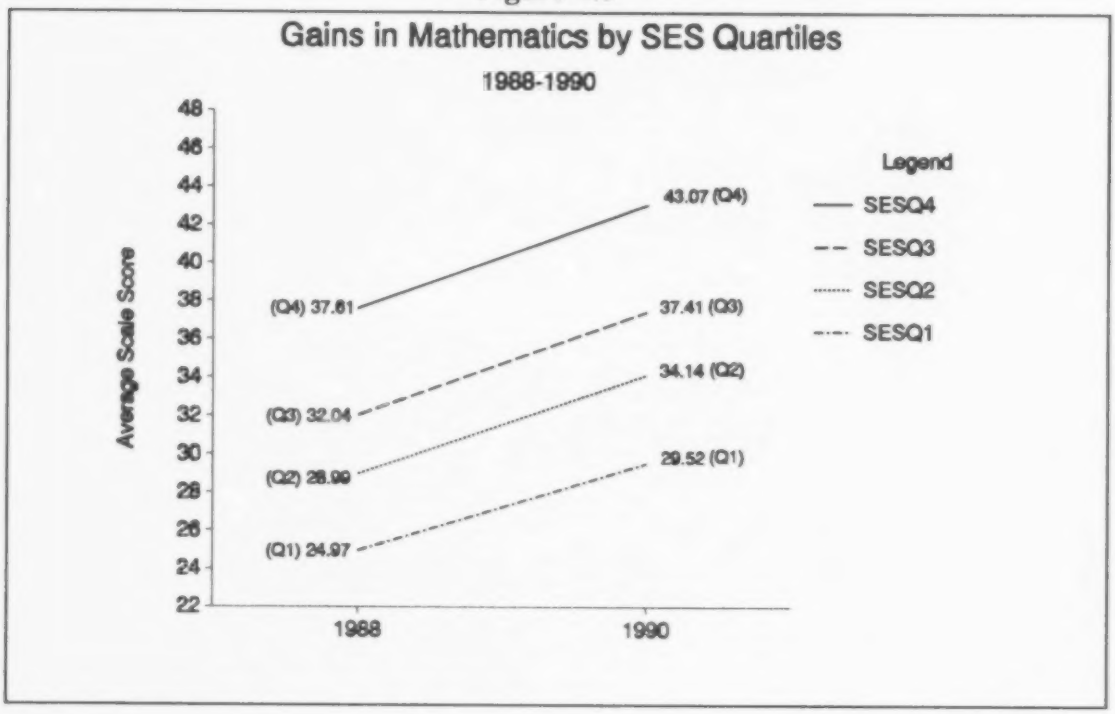
SOURCE: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Figure 4.4



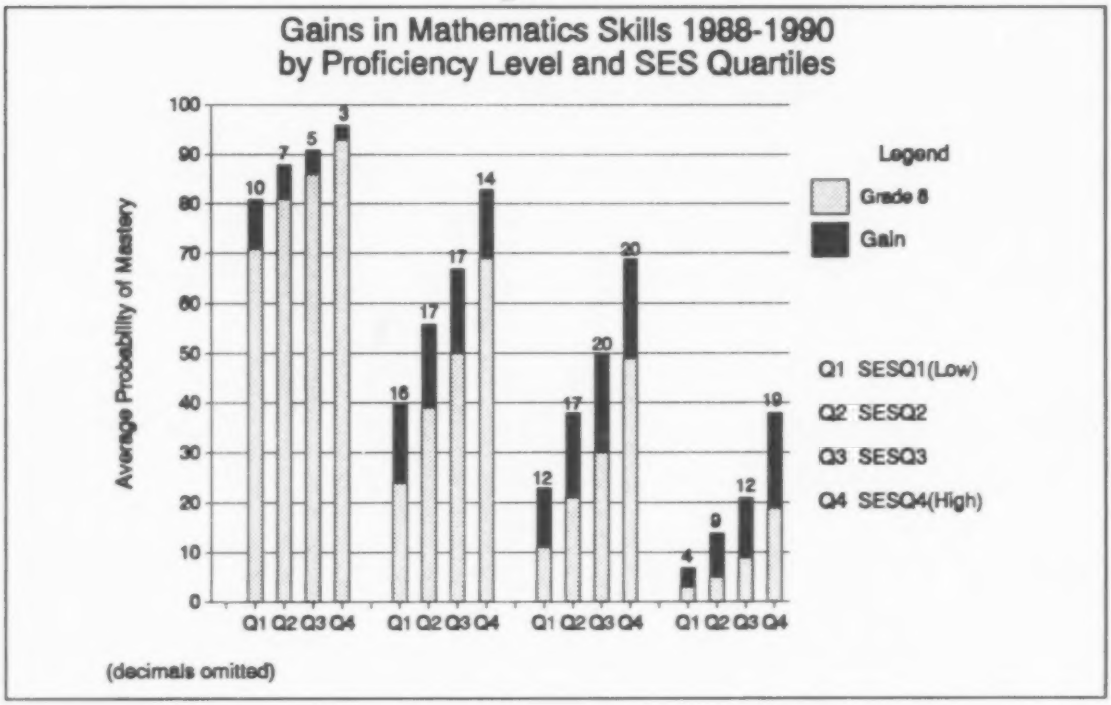
SOURCE: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Figure 4.5



SOURCE: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Figure 4.6



SOURCE: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Figures 4.7 and 4.8 show gains for students grouped by the number and type of mathematics courses taken. These figures attempt to relate opportunity to learn (OTL) to actual learning gains. The term "opportunity to learn" does not make any assumptions about whether the courses were or were not available to students, it simply means that students, for whatever reason, reported taking certain courses and not others. Figure 4.7 indicates that the group of students who took advanced mathematics courses and their prerequisites, as well as the group who took at least a year of geometry and/or algebra, showed significantly more gains in total scale scores than those students who took only course work below the level of algebra and geometry. Figure 4.8 indicates that students who took no mathematics courses or lower level mathematics courses (labelled Low Math) or algebra and/or geometry (labelled Alg./Geom.) not only demonstrated less gain on the test as a whole, but also showed less gain in level 4 tasks (problem solving) compared to students who reported taking more advanced mathematics courses (labelled Adv. Math). Students taking advanced courses show greater learning gains in the complex problem solving areas (levels 3 and 4) than in level 1 and 2 basic skills.

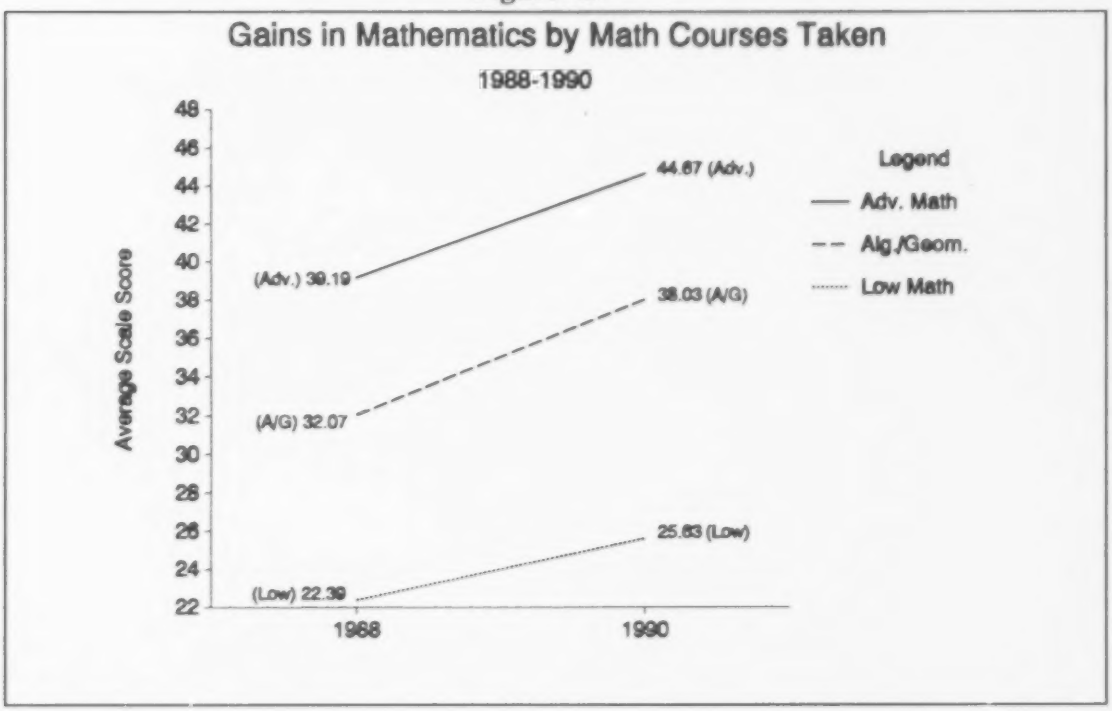
Figures 4.9 and 4.10 present mathematics gains by type of school attended. The only difference in total scale score gain that was statistically significant was the comparison of Catholic schools and National Association of Independent Schools (NAIS), which showed greater gains for Catholic schools. However, there is some evidence of a ceiling effect for NAIS schools. Many of the NAIS students may have "bumped" against the test ceiling, that is, they had little room to gain in the skills measured by this

test, because they had very high scores initially. This group might have showed more gain if the 1990 test had been harder.

Figure 4.10 indicates that the greatest incremental learning for the high prestige NAIS private school students takes place in level 4 mathematics skills (primarily complex problem solving) compared to the other three levels. Public school students show considerably smaller learning gains in level 4 skills than their counterparts at the NAIS and Catholic schools.

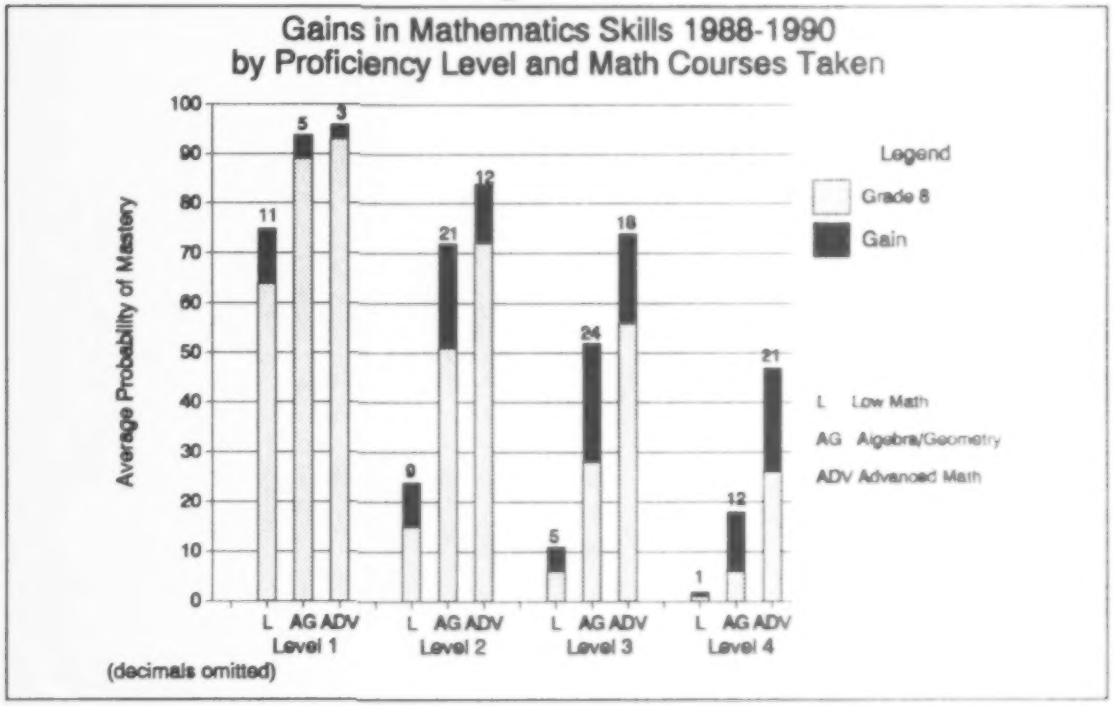
Figures 4.11 and 4.12 present mathematics gains by first follow-up curriculum classification. Figure 4.11 indicates that the average gains are greater for students who report being in the academic or the general curriculum program than for their counterparts in the vocational curriculum program, thereby widening the initial gap of more than a standard deviation between the vocational and academic groups. The pattern of these gains as shown in Figure 4.12 indicates that vocational students show comparatively less gain than students in the other two curricula with respect to level 3 and level 4 mathematical skills.

Figure 4.7



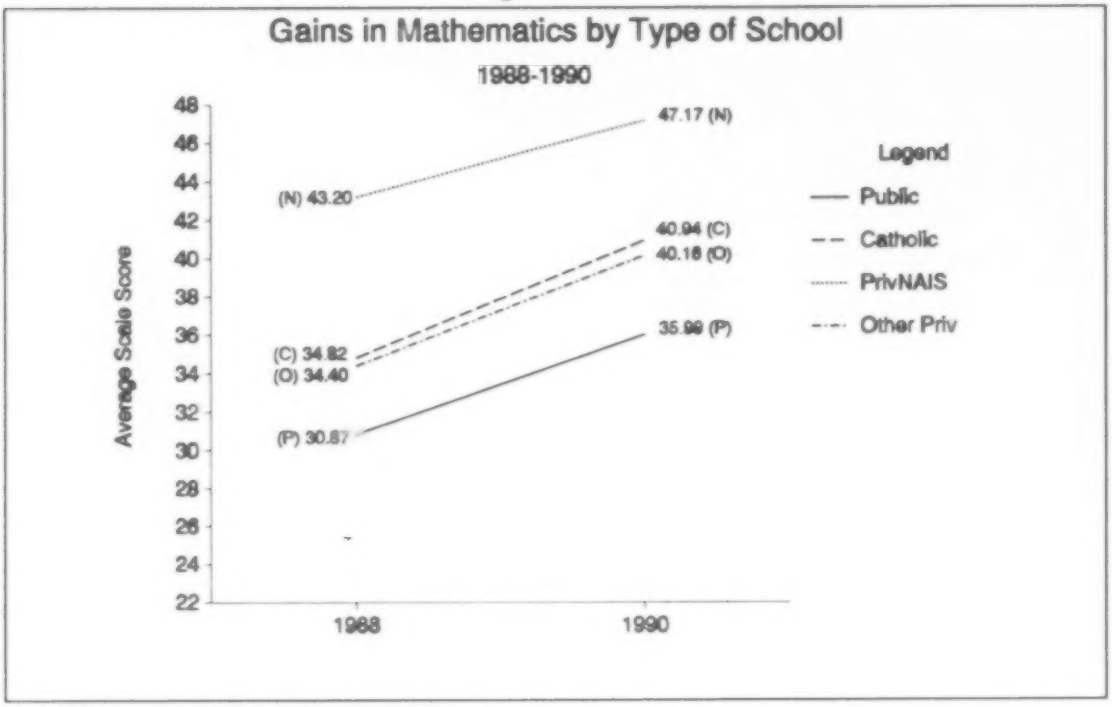
SOURCE: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Figure 4.8



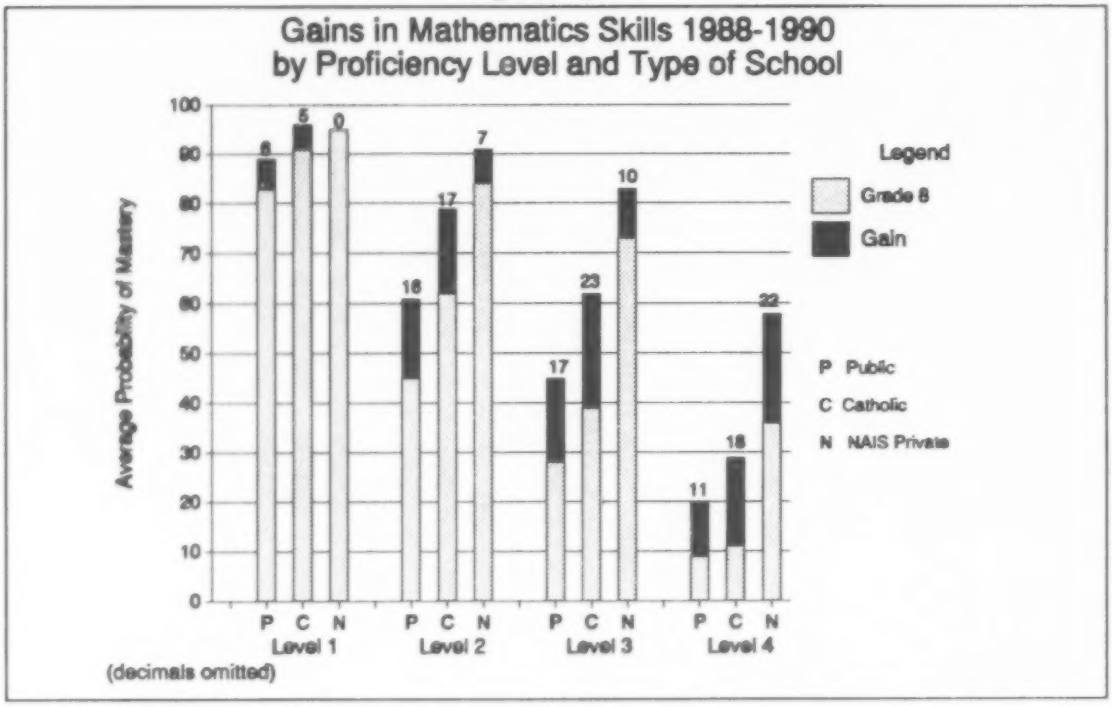
SOURCE: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Figure 4.9



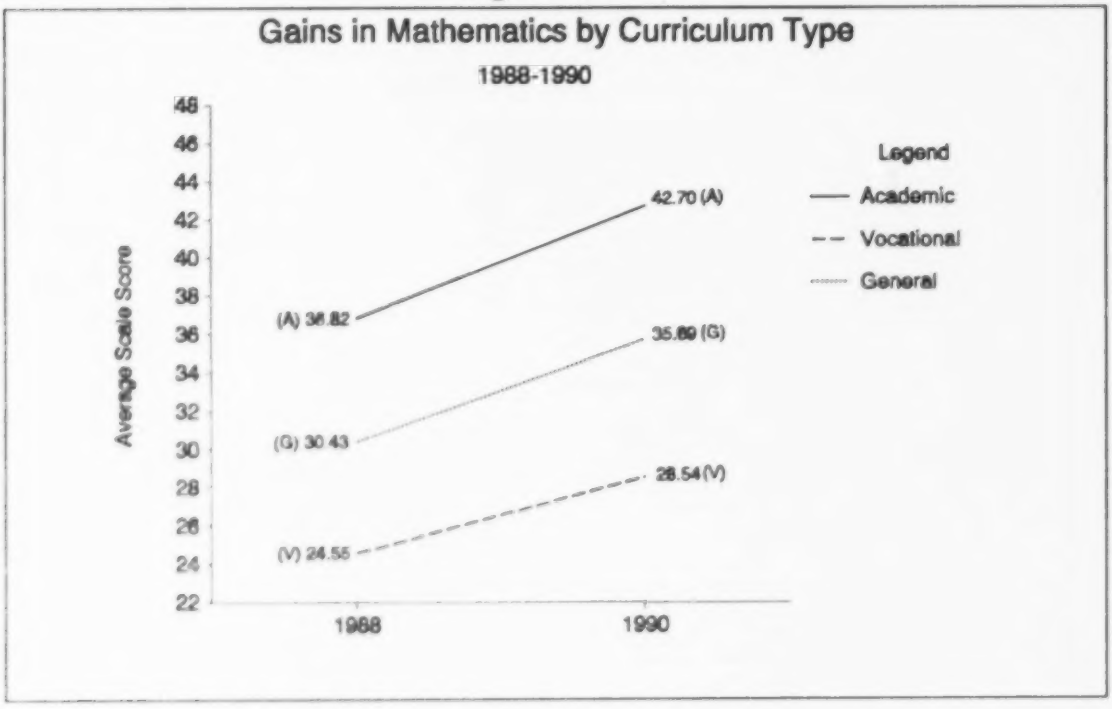
SOURCE: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Figure 4.10



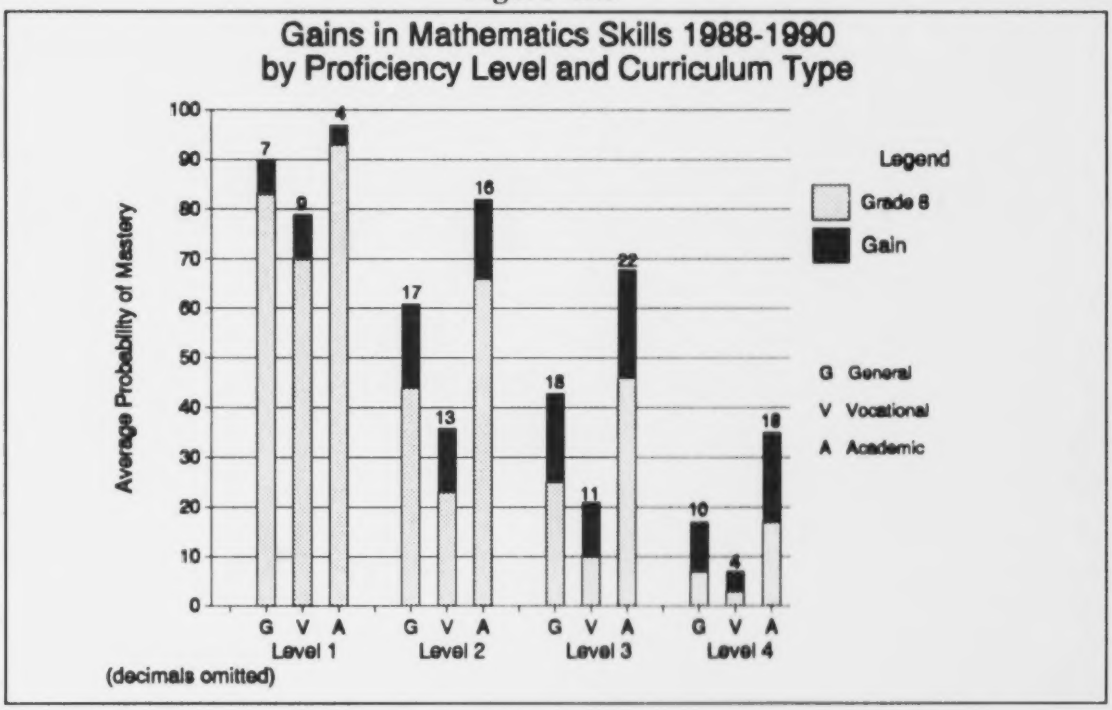
SOURCE: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Figure 4.11



SOURCE: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Figure 4.12



SOURCE: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Growth in Reading Comprehension

Total scale score gains in reading comprehension averaged about a third of a standard deviation in the two years following eighth grade for the NELS:88 sample as a whole. There were no substantial improvements in the overall proportion of students who had mastered level 1 reading skills (reproduction of detail and/or the author's main thought), with the average probability of proficiency rising from .87 to .89. Most of the gain was at level 2 (ability to make inferences and/or to understand and evaluate abstract concepts). Mastery of these skills increased from 38 percent to 51 percent during the two year period. The tendency for students to be making larger gains in level 2 than level 1 skills was consistent for all of the population subgroups studied as well. Score statistics for the total sample and subgroups can be found in Appendix A.

Figures 4.13 and 4.14 present the reading comprehension gains for racial/ethnic groups. While there were large differences in average reading **performance** (as measured by both total scale score and probability of proficiency) between white or Asian students and black or Hispanic students in both 1988 and 1990, there was little difference between the four groups with respect to mean **gain**. Figure 4.13 shows all groups gaining between two and three total scale score points. Figure 4.14 shows little differentiation among the racial/ethnic groups with respect to where the gains were taking place, with all

groups making larger improvements at level 2 than at level 1 skills; racial/ethnic group gaps in proficiency rates remained relatively stable.

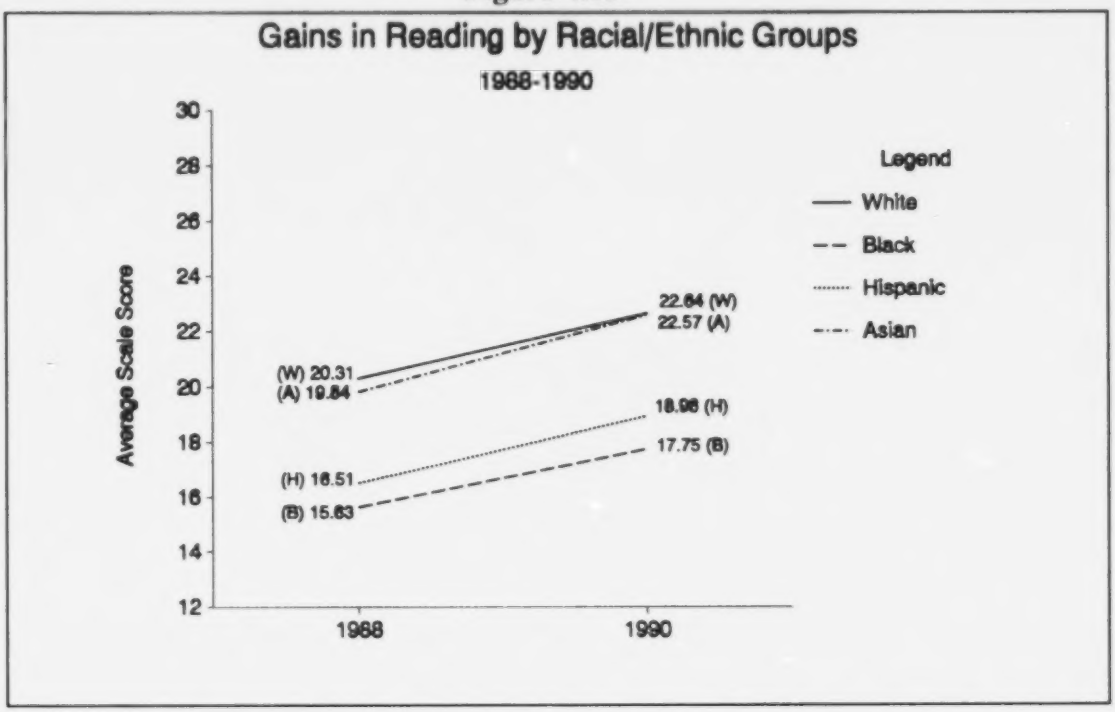
Reading comprehension gains by gender groups are shown in Figures 4.15 and 4.16. Both sexes show similar total scale score gains and patterns of gain, with both groups showing more growth at level 2 than level 1. The small advantage females demonstrated in 1988, about a fifth of a standard deviation for the total scale scores as well as both proficiency levels, remained constant over the two year period.

Figures 4.17 and 4.18 present the reading comprehension gains for the four SES quartiles. The lines in Figure 4.17 show the large and significant differences between adjacent quartiles in average total scale score at both time points. However, the differences in mean **gains** are small, with the higher group of each pair showing slightly more improvement over time than the one below. Only the difference between the lowest and highest quartile is large enough to approach statistical significance. Figure 4.18 indicates that all groups showed larger gains on level 2 than on level 1 material.

Figures 4.19 and 4.20 present the reading comprehension gains by type of school attended. Figure 4.19 suggests that there is little difference between the different types of schools in mean gains over time, with NAIS students having the highest average total scale scores, and public students the lowest, both in eighth grade and two years later. Figure 4.20 indicates that all groups showed their greatest gains at level 2. About four-fifths of NAIS students and two-thirds Catholic students, but less than half of public school students, demonstrated mastery of level 2 reading comprehension at the time of the first follow-up.

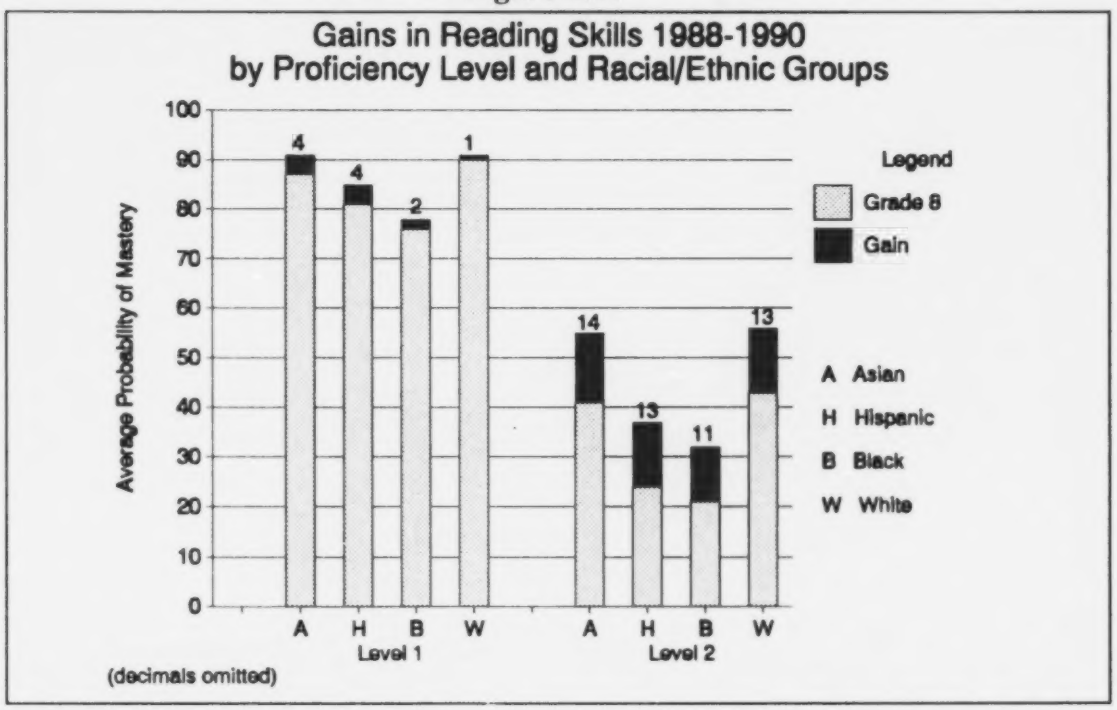
Figures 4.21 and 4.22 present the reading comprehension gains by type of curriculum. Figure 4.21 indicates that the students in the vocational curriculum show significantly less gain than their counterparts in the academic group, widening a gap in average total scale score that already exceeded one standard deviation in eighth grade. By 1990, more than two thirds of students in the academic curriculum were proficient in inferential reading, compared to just over a quarter of vocational students.

Figure 4.13



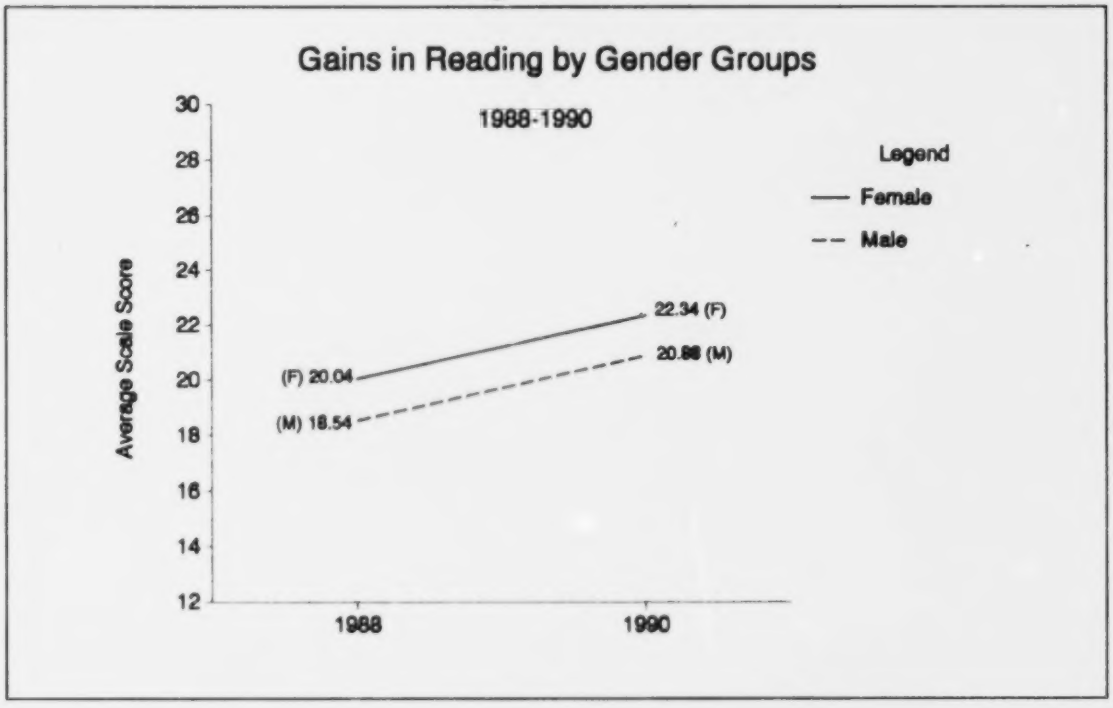
SOURCE: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Figure 4.14



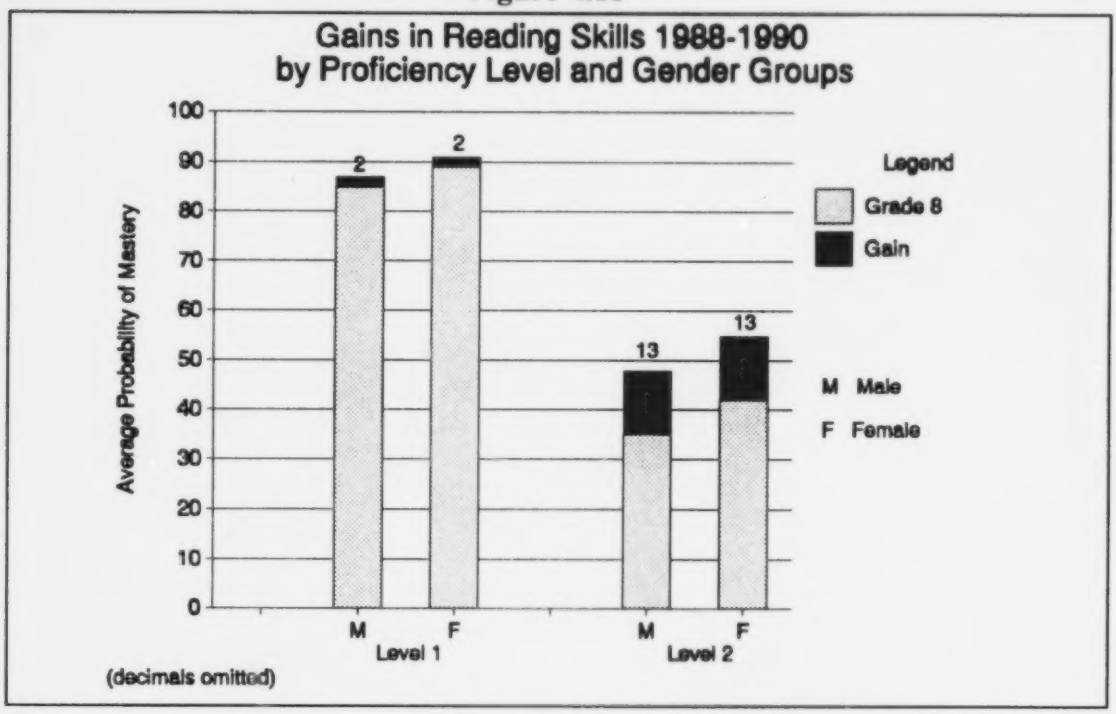
SOURCE: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Figure 4.15



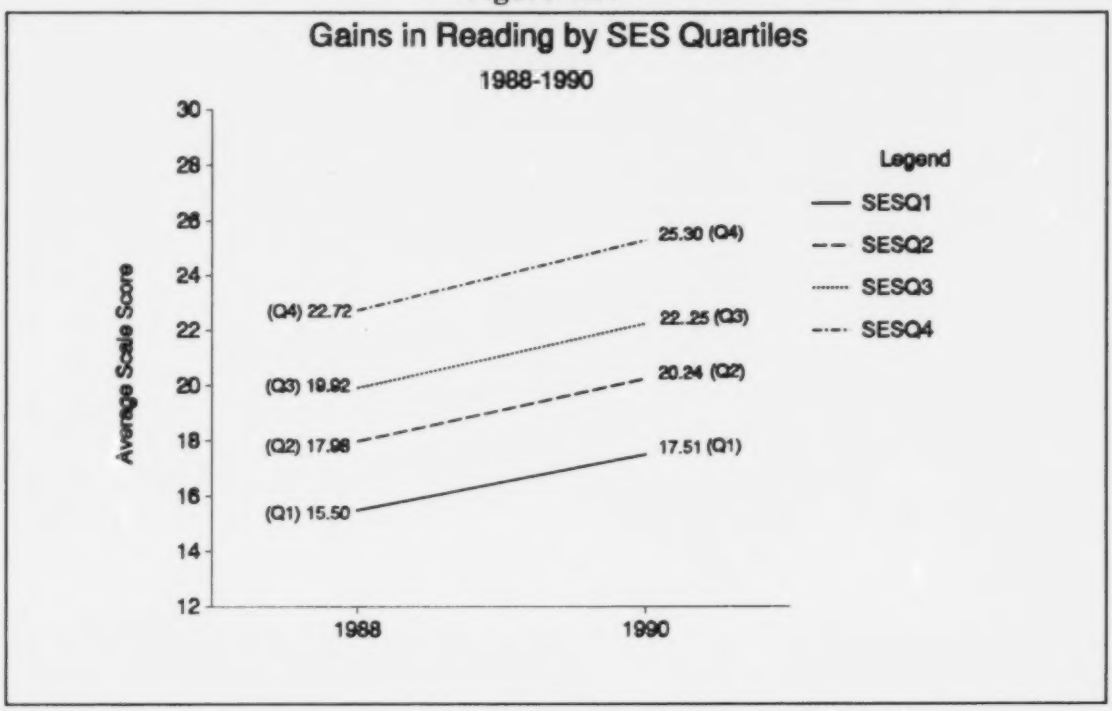
SOURCE: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Figure 4.16



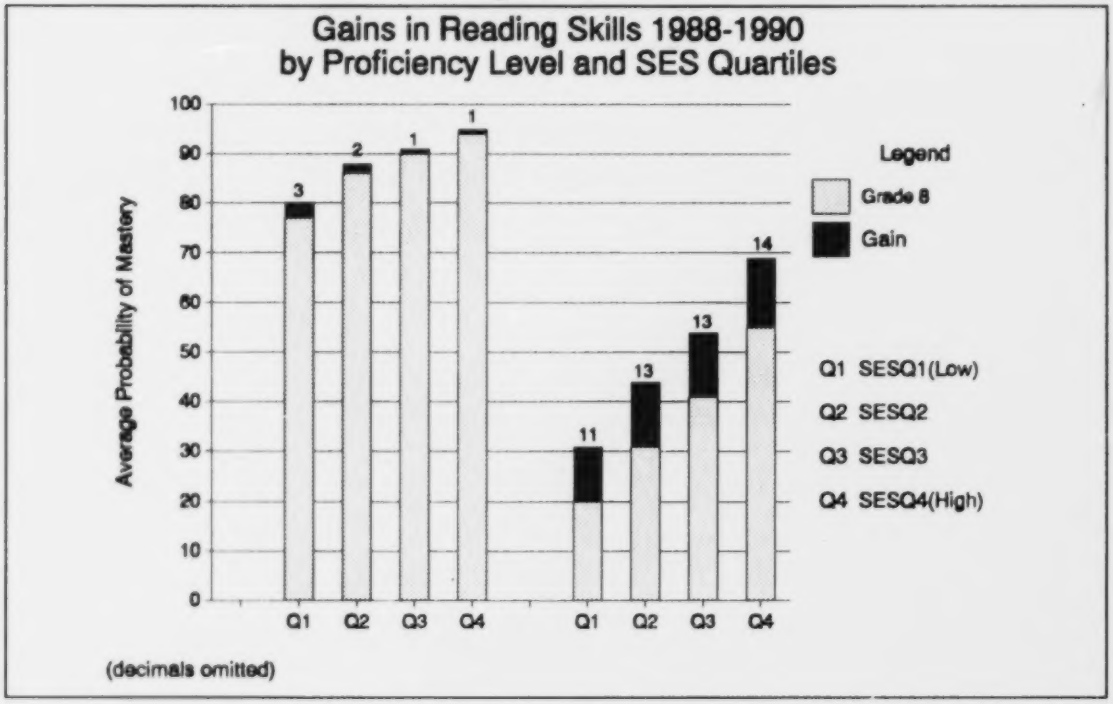
SOURCE: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Figure 4.17



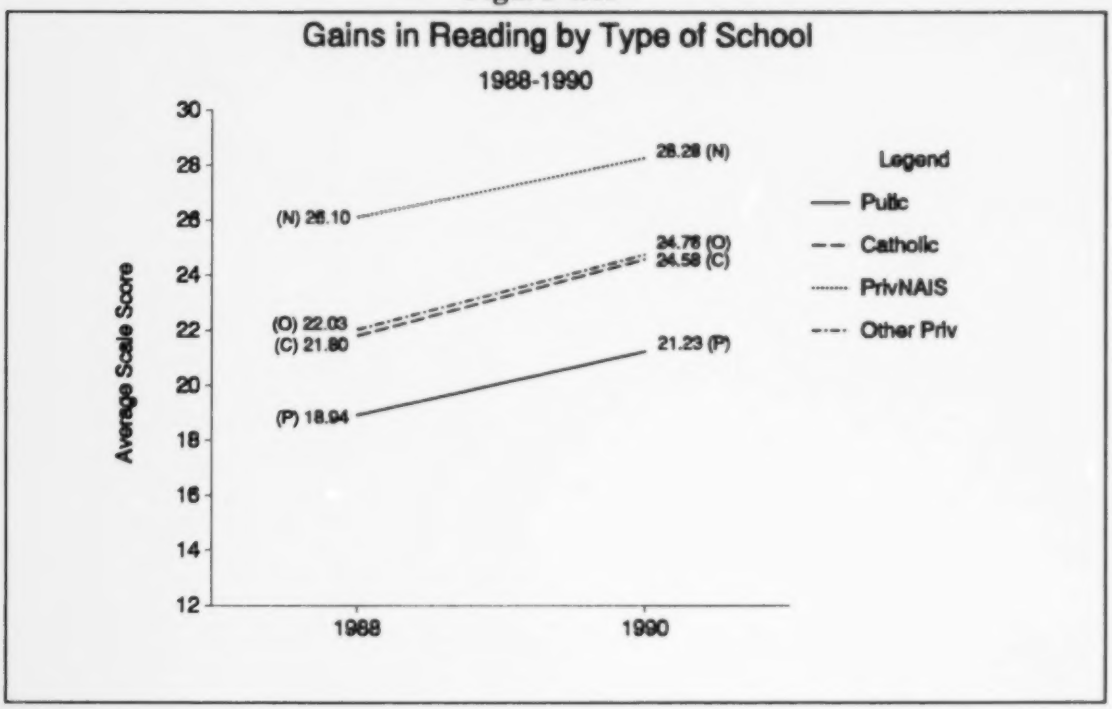
SOURCE: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Figure 4.18



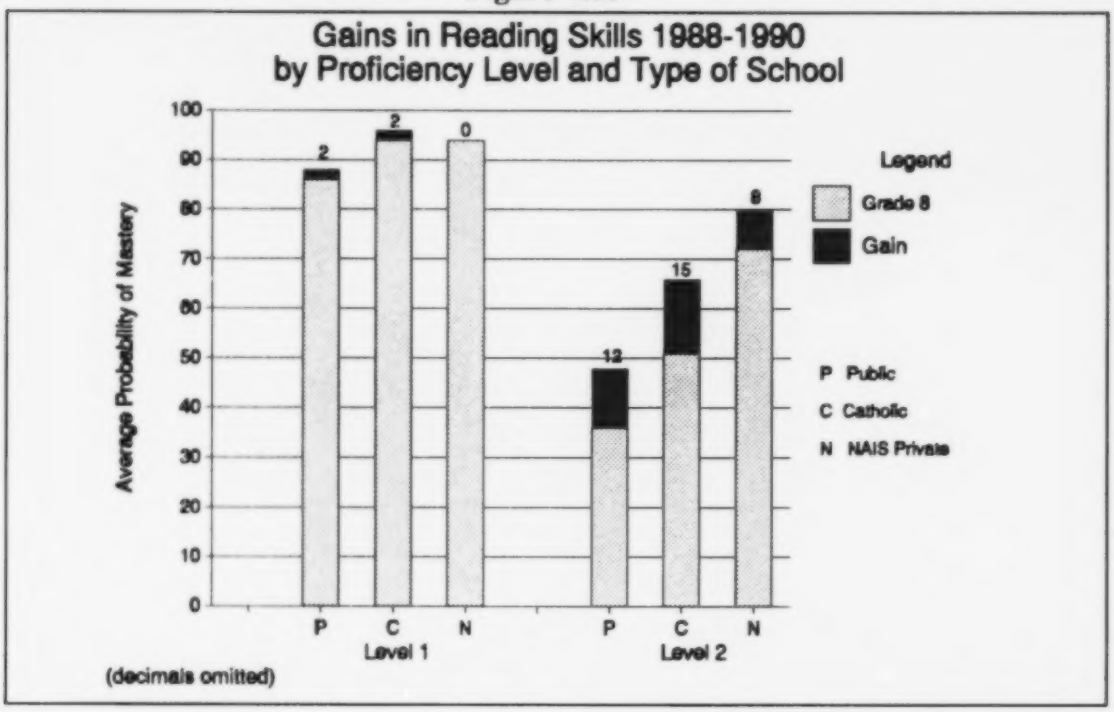
SOURCE: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Figure 4.19



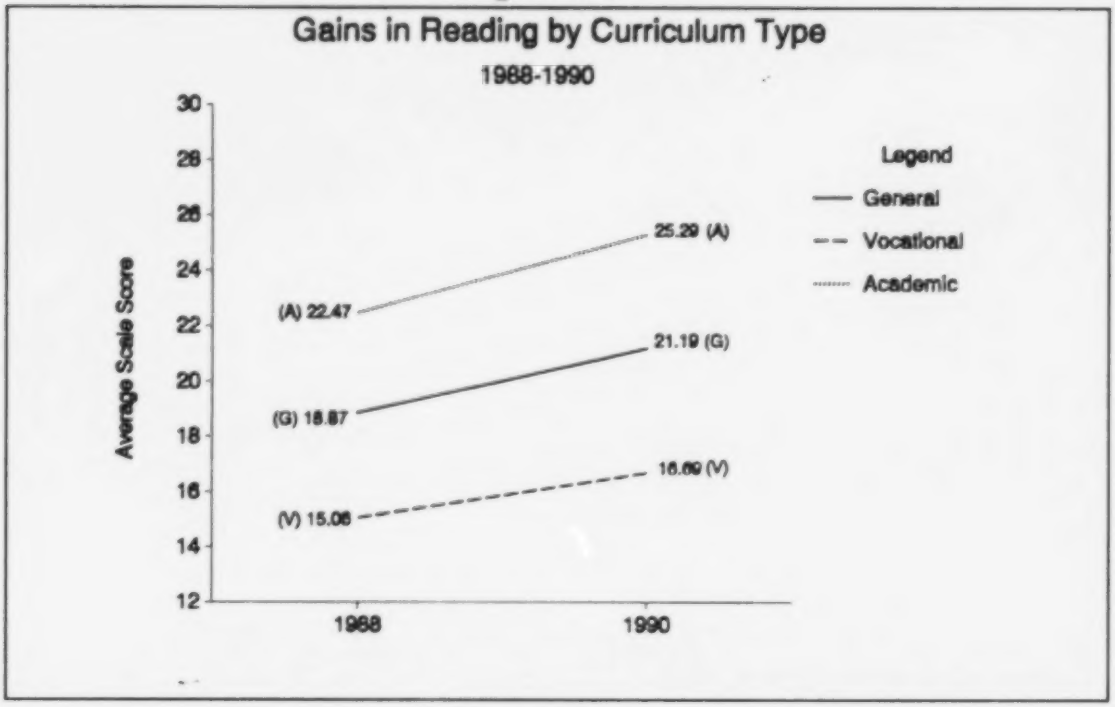
SOURCE: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Figure 4.20



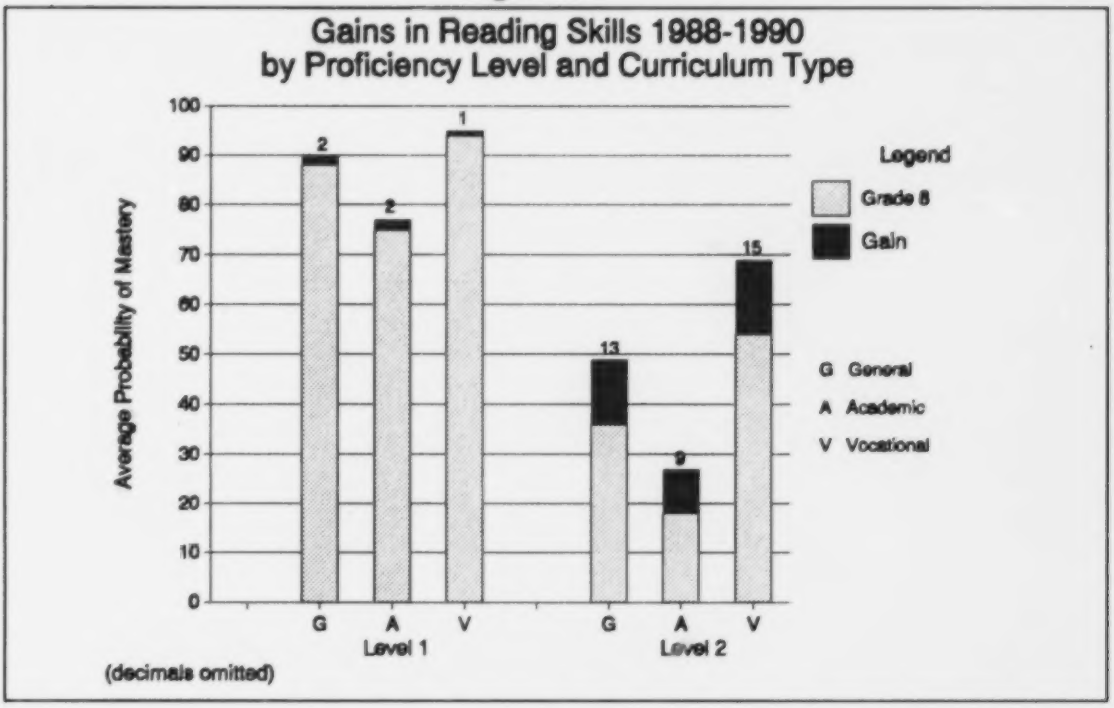
SOURCE: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Figure 4.21



SOURCE: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Figure 4.22



SOURCE: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Growth in Science

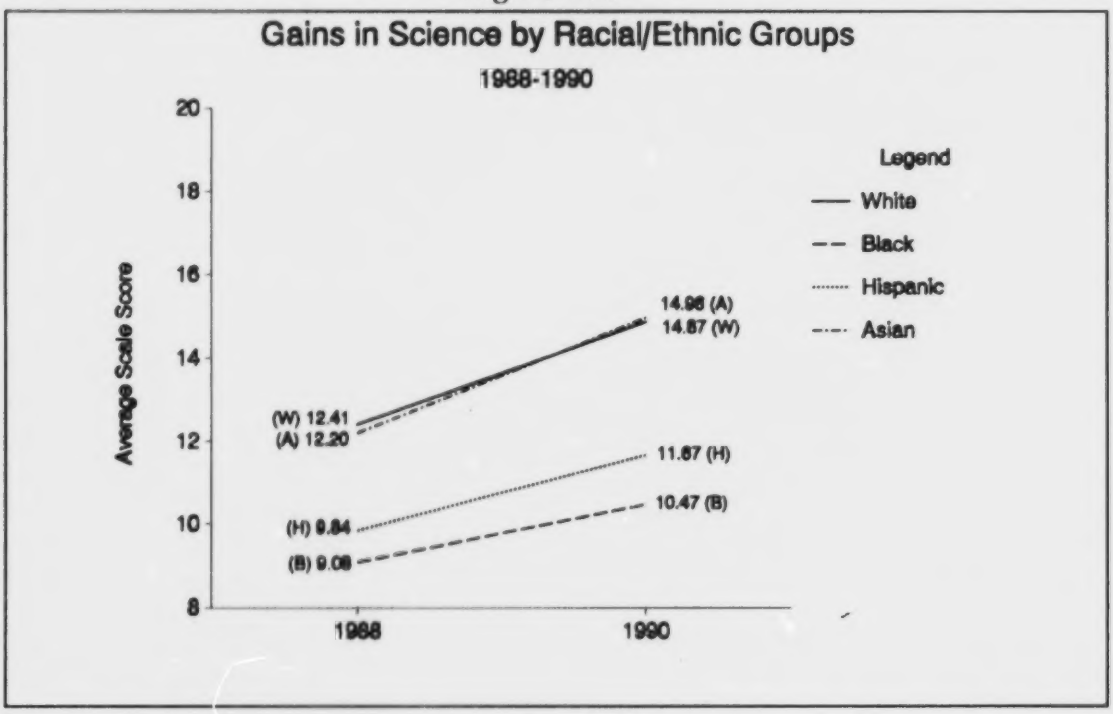
Average gains of half a standard deviation (in base year units) were observed in NELS:88 first follow-up science total scale scores. Appendix A, contains score statistics for the total sample and subgroups. Proficiency levels were not available for science at this time. However, the accompanying graphs do illustrate mean overall achievement gains for subpopulations, which tell at least the first part of the gain story, i.e., the part without the diagnostics. Unlike mathematics, where average increases in total scale scores were very similar for different population subgroups, there were substantial subgroup differences in total scale scores on the science test. In general, the groups with the highest average science scores in eighth grade tended also to show the most gain by 1990. Figures 4.23 through 4.28 present the mean gains in total scale scores for the six selected population breakdowns.

Demographic differences are illustrated in Figures 4.23 to 4.25. Asian and white students showed greater gains on average than did black or Hispanic students, increasing disparities that already favored Asian and white students over black and Hispanic students by about half to three quarters of a standard deviation in eighth grade. Males not only outperformed females by a fifth of a standard deviation in the base year, but also showed larger gains over time. The four SES quartiles differed by a gap of a quarter of a standard deviation in average score between each adjacent pair of quartiles in eighth grade. The higher scoring groups also gained more over time: when the SES groups are ordered from low to high

quartile, each SES group gained a greater amount in science than the next lower group. The differences are not large enough to be statistically significant for adjacent quartiles, but are significant when comparisons are made between quartiles separated by one or more intermediate groups.

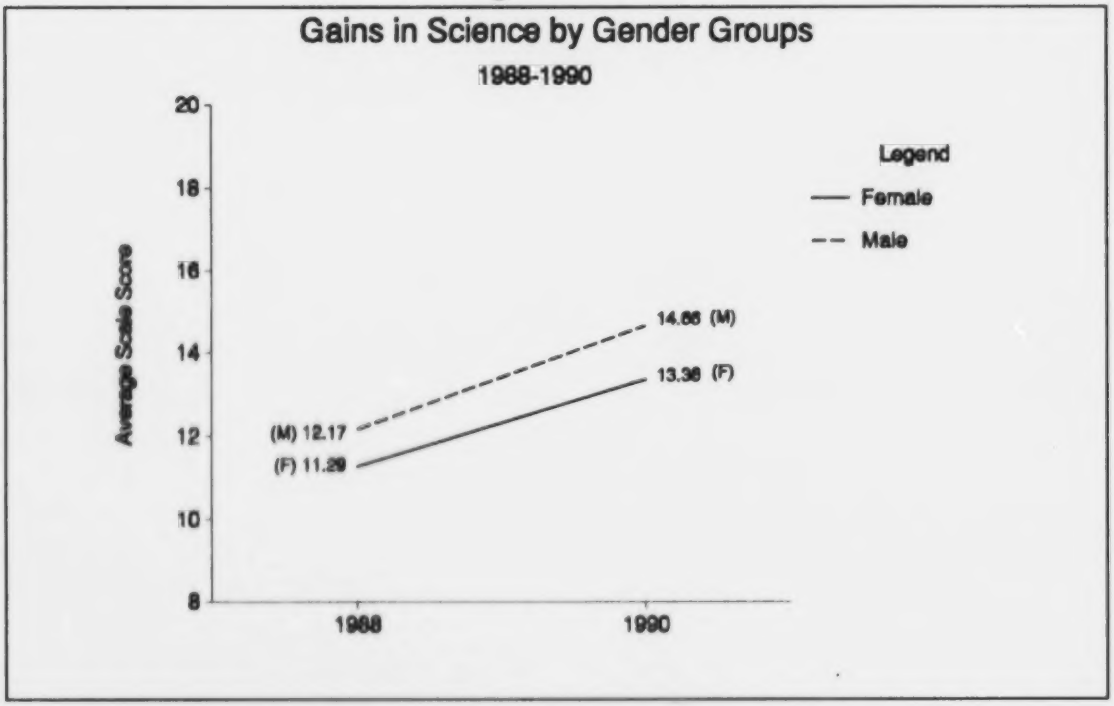
In terms of school experiences, Figures 4.26 to 4.28 show changes in total scale score means for groups of students classified by the science courses they had taken, by the type of schools they attended, and by their curriculum track. Students who took either no science courses or only a general science course (labelled Gen Sci) not only started with lower average scores, but also gained significantly less than those students who took a biology course (labelled Biology) or those with advanced science courses, i.e., those students who took biology plus either chemistry or physics (labelled Chem/Phys). Public school students started with lower average science scores and gained less than their counterparts in NAIS schools. Those eighth graders who were enrolled in a vocational curriculum at the time of the first follow-up had scored nearly half a standard deviation lower in science in 1988 than those who went into a general curriculum, and nearly a whole standard deviation lower than those who later ended up in the academic track. These gaps increased over time, since the average gain in total scale score points for vocational students was significantly lower than for their counterparts in the general or academic program.

Figure 4.23



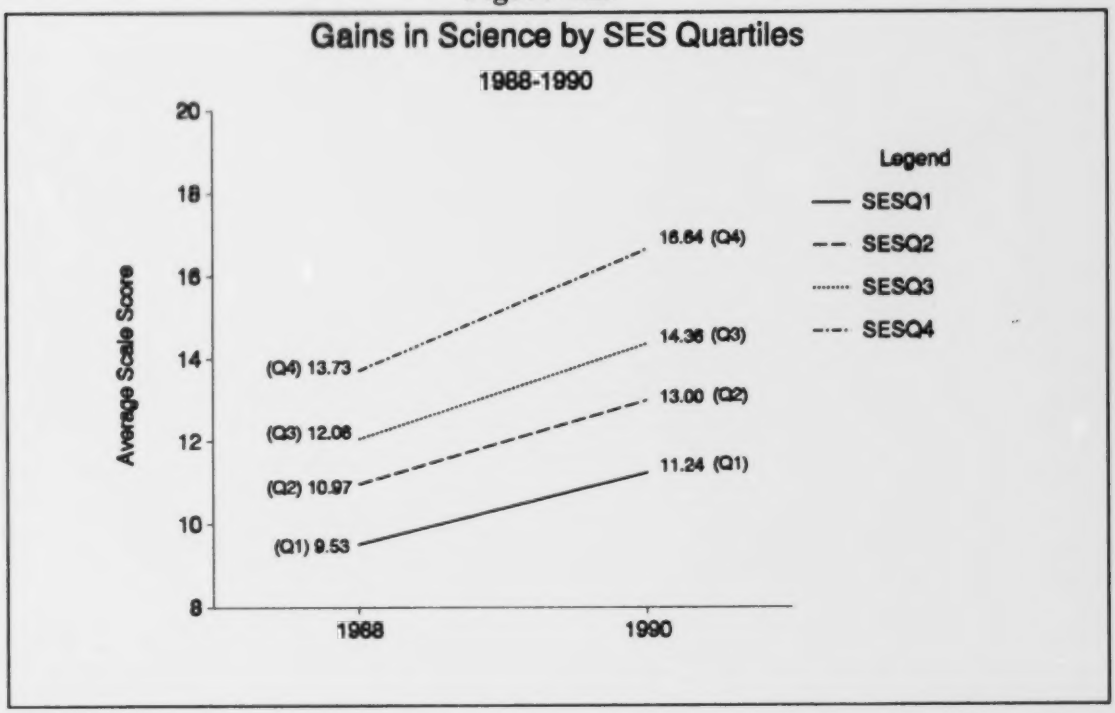
SOURCE: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Figure 4.24



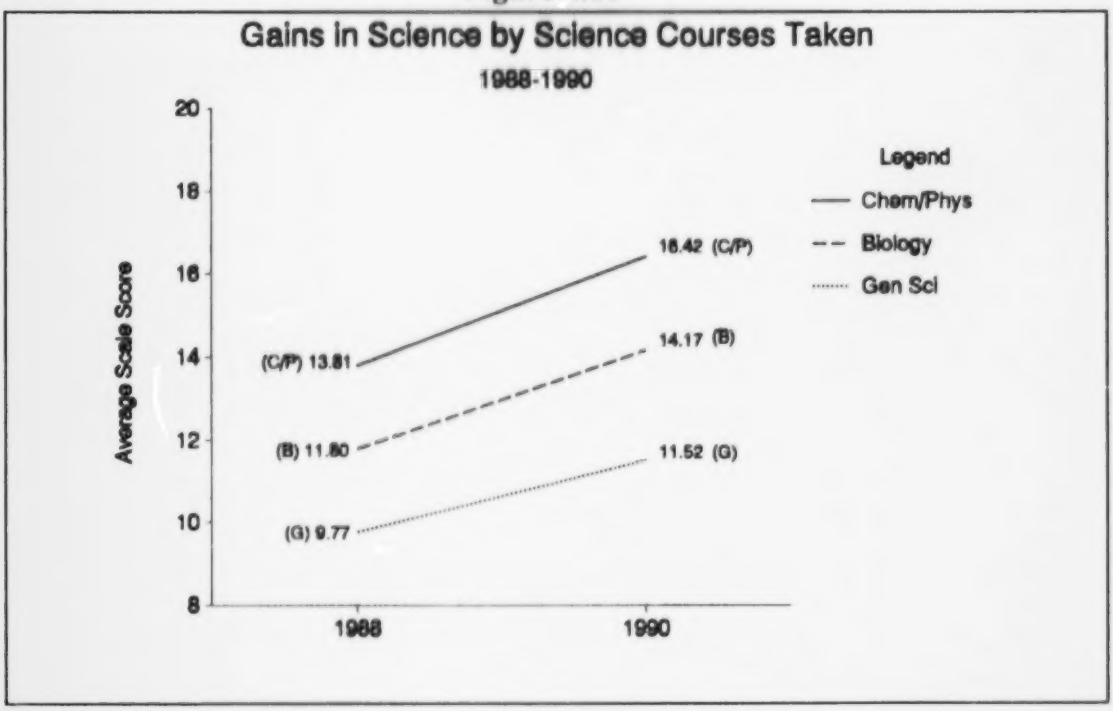
SOURCE: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Figure 4.25



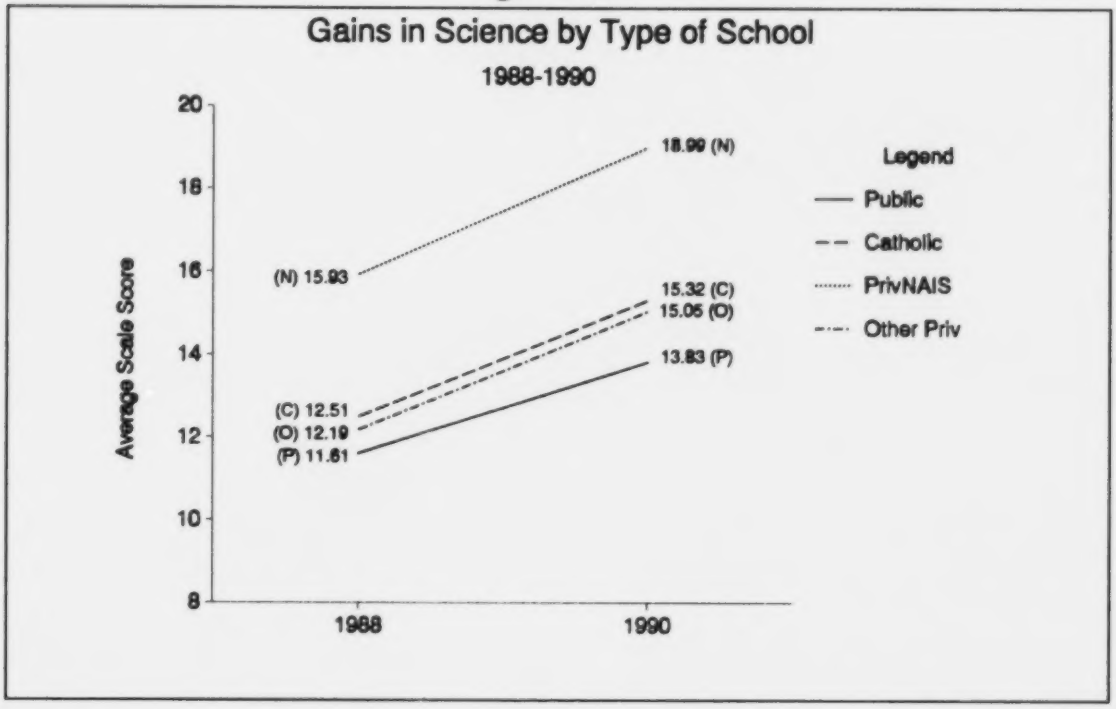
SOURCE: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Figure 4.26



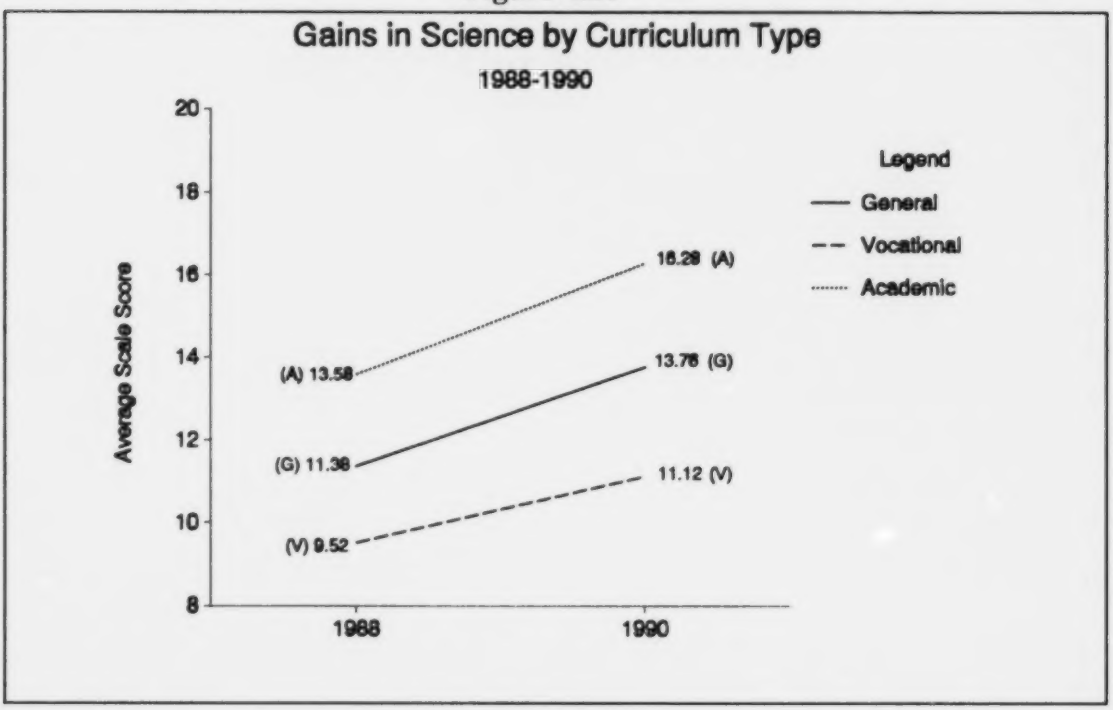
SOURCE: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Figure 4.27



SOURCE: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Figure 4.28



SOURCE: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Growth in History/Citizenship/Geography

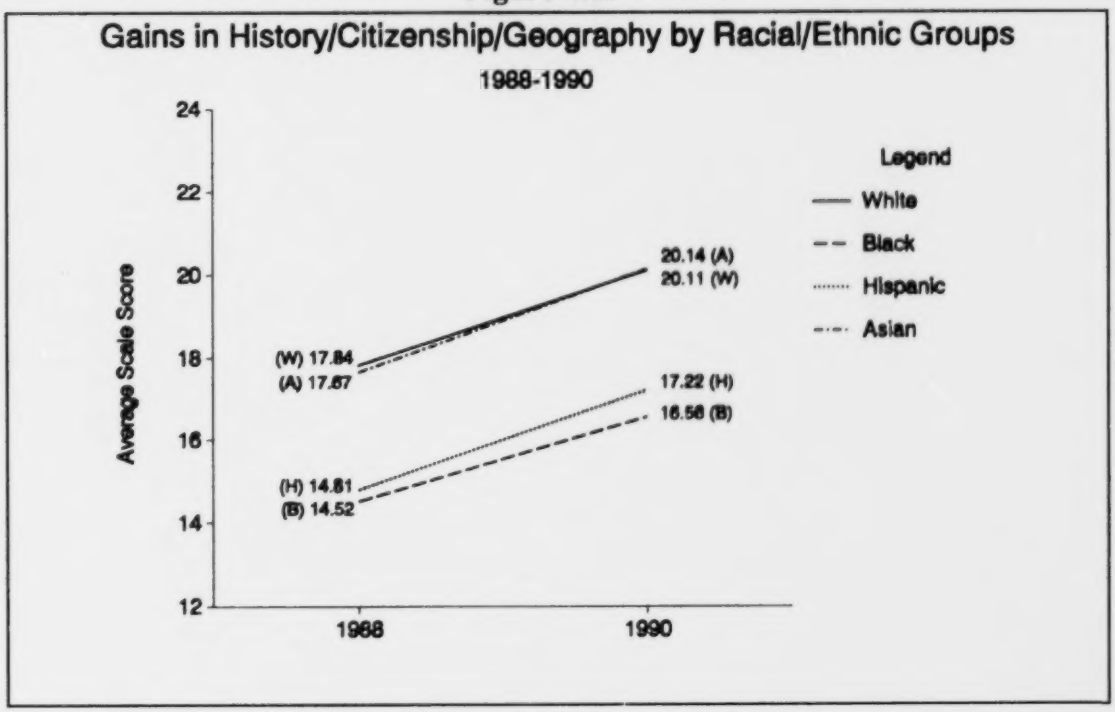
On average, first follow-up students gained about 42 percent of a standard deviation in the total scale score metric over their base year performance on the history/citizenship/geography (HCG) test. Score statistics for the total sample and subgroups are presented in Appendix A. Figures 4.29 to 4.33 illustrate the average mean score gains for various subpopulations on the HCG scale. The HCG test did not support a "building block" proficiency level model, that is, mastery of easier material cannot be assumed to be a necessary condition for proficiency at higher levels. The graphs show where subpopulations were making gains, but the different score levels cannot be tied to the type (quality) of learning that took place at that point. Although there are large differences in average **achievement** of the subpopulations at either point in time, there were no significant differential **gains** in performance by subpopulation in the HCG content area.

Comparing Gains by Subject Areas

Comparing gains by subject areas allows one to identify those subject areas which are showing comparatively greater gains than others. As noted earlier, these results are sensitive to the choice of content for each of the test forms. Efforts were made to have the test items reflect the range of material typically taught during ninth and tenth grades. Figure 4.34 shows the mean gains scaled by pretest

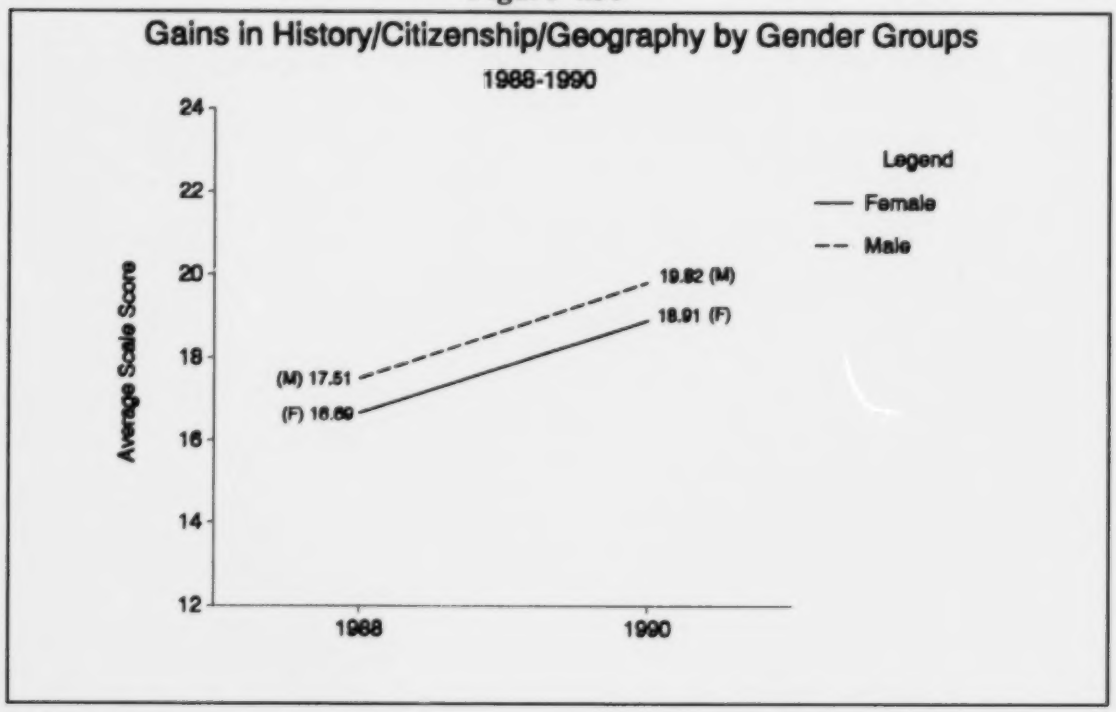
standard deviation units (1988 to 1990 gain, divided by 1988 standard deviation) for each of the four subject areas. The largest gains are in the most curriculum-dependent subject areas, science and mathematics, with average scores increasing by about half a standard deviation in each subject. Most students continue to take courses in these subject areas in ninth and tenth grades. The fact that reading comprehension shows the least gain, one third of a standard deviation, is consistent with the notion that the largest reading gains are made during the early years of schooling. Smaller mathematics and science gains may be expected in the last two years of high school, since there tend to be fewer required courses in these subjects in the later years. Students who do not take advanced courses in these areas will probably show little or no gain in achievement.

Figure 4.29



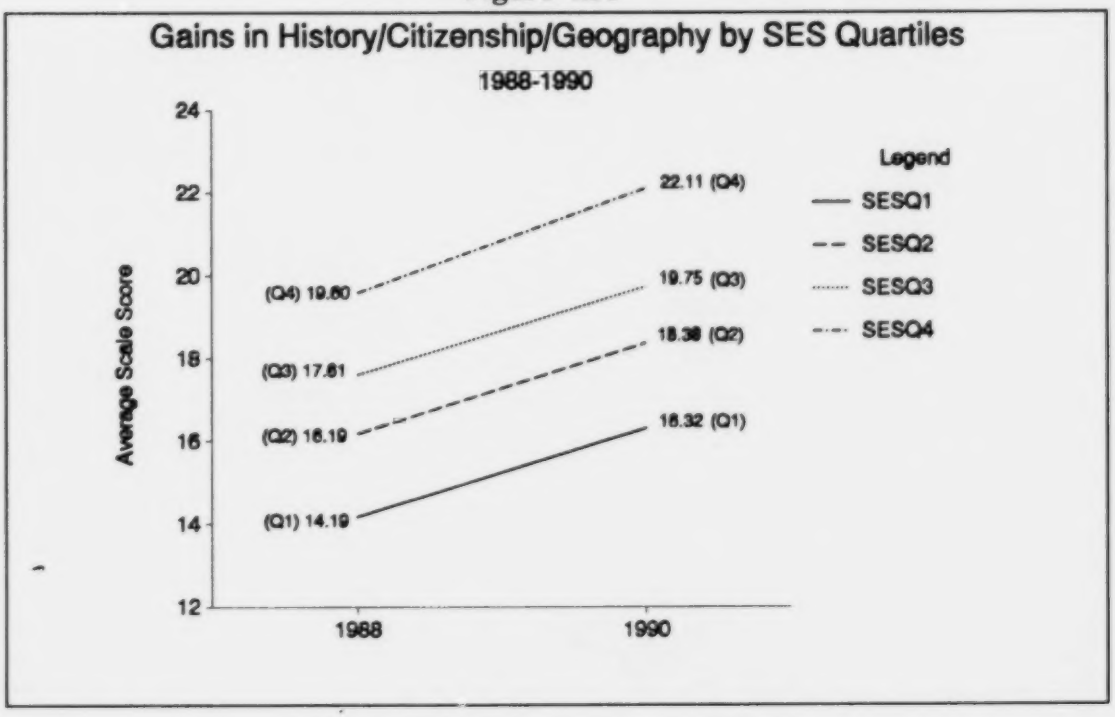
SOURCE: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Figure 4.30



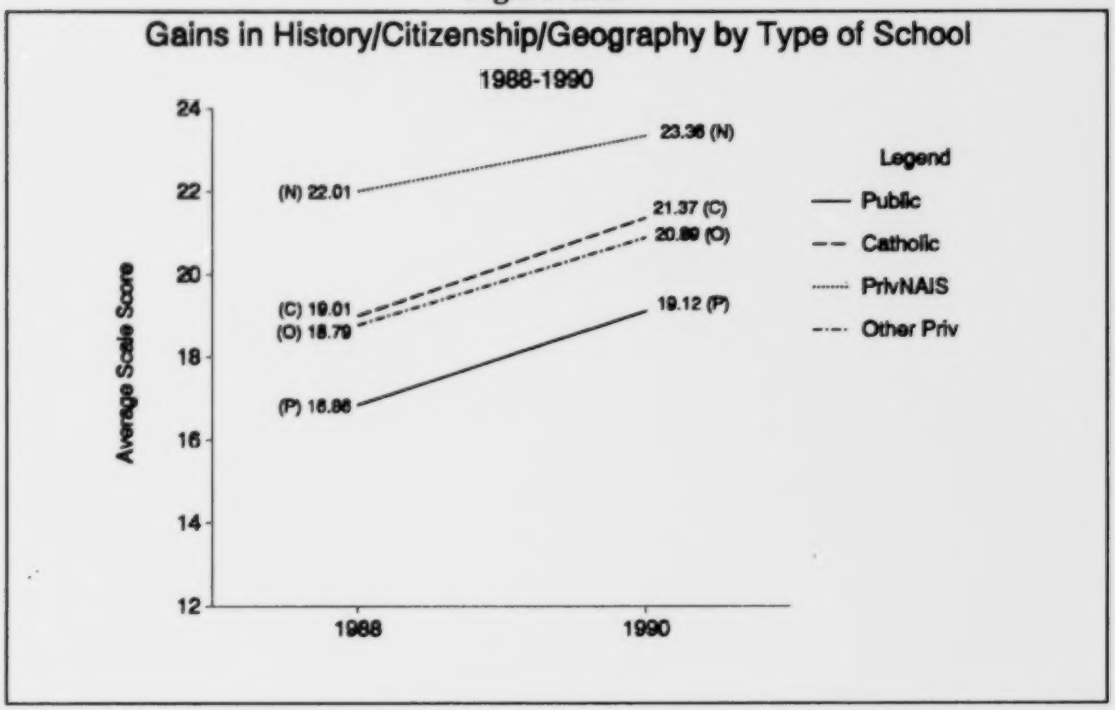
SOURCE: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Figure 4.31



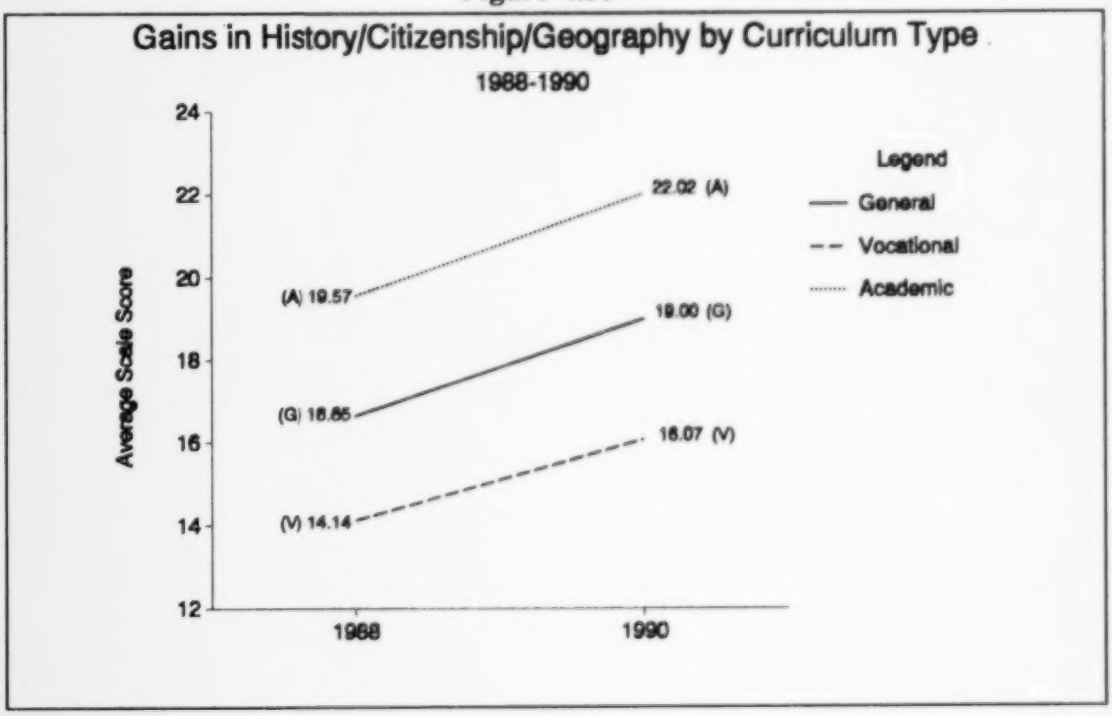
SOURCE: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Figure 4.32



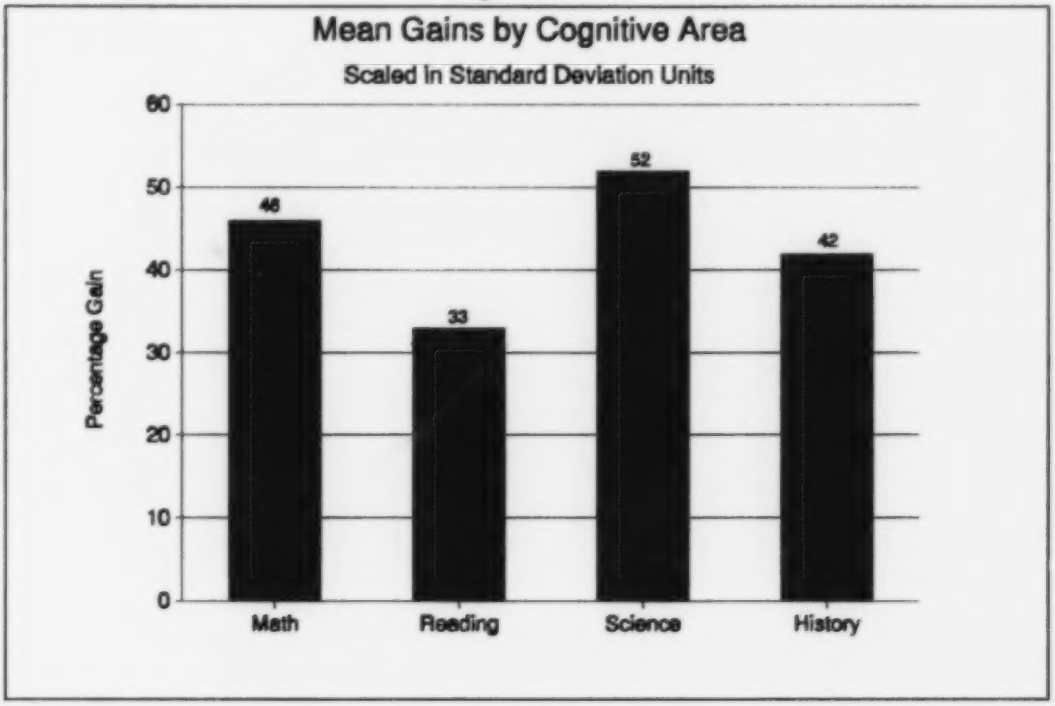
SOURCE: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Figure 4.33



SOURCE: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Figure 4.34



SOURCE: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Summary of Achievement Gains in the Two Years Following Eighth Grade

How Much Did Students Gain in Total Scale Score Points?

- Total scale score gains averaged about one third to one half of a base year standard deviation in each subject area. The largest gains were in science and mathematics, in which the test items were closely matched to typical curriculum content.

- Gaps in science achievement increased over the two year time interval for all of the categories studied. Demographic groups that had scored highest initially (Asian and white students, males, and high-SES students) also made the largest gains. Students who had not taken biology or an advanced science course, and those in a vocational curriculum, fell further behind. Average score gains for students in Catholic and NAIS schools exceeded those for public schools.

- In reading and history/citizenship/geography, subgroup differences in average total scale scores remained relatively constant over time. In these subject areas, there is likely to be less differentiation among subgroups in ninth and tenth grades with respect to curriculum content than is the case for mathematics and science.

- Students in most subgroups showed similar amounts of gain in mathematics, preserving initial differences between mean scores. The exceptions were students in a vocational curriculum and those who reported not taking algebra or a higher level mathematics course, who gained less than the other groups, as well as had lower initial average scores. Similar **amounts** of gain, however, do not imply gains in similar **types** of skills.

At What Skill or Mastery Levels Did Mathematics Gains Take Place?

While the quantitative or mean gains on the mathematics total score scale appeared quite similar for most subpopulations, the nature of gains, as demonstrated by increases in mastery rates for the proficiency levels, differed by subpopulations.

- The groups that initially lagged behind in level 1 arithmetic skills (black and Hispanic students, those from low SES families, and those who did not take advanced math courses) made up some of the deficit in basic skills. Groups that already had high mastery rates in arithmetic at grade eight gained somewhat less.

- The greatest gains, both for the population as a whole and for most subgroups, were in level, 2 and 3 mathematics: operations on decimals, fractions, and roots; and simple problems requiring conceptual understanding. The test questions at these levels might be expected to correspond to students' experiences in ninth and tenth grade mathematics courses.

- Subgroup differences in level 4 complex problem solving increased over time. The groups with the highest mastery rates at grade eight made the largest gains in complex problem solving. These groups included Asian and white students and high-SES students, as well as those who took advanced math courses, attended NAIS private schools, and enrolled in an academic curriculum.

There is obviously a strong association between students' racial/ethnic group and their families' socioeconomic status; similarly their propensity to attend private schools and take high level courses is correlated with these factors. The descriptive statistics reported in this chapter make no attempt to identify the relative contribution of these or other factors to tested achievement, or to infer causality.

Chapter 5: Summary and Conclusion

This report has described some of the changes and continuities experienced by the nation's 1988 eighth grade cohort by the spring of 1990. Four kinds of stability and change were investigated. These were:

(1) **Enrollment status of the eighth grade class of 1988.** Some members of the eighth grade cohort elected to remain in school while others dropped out;

(2) **School transitions.** Most students went to a new school. Some switched sector, moving from a public to a private or from a private to a public school. Others remained within the same sector but may have changed to a learning environment that was differently structured, as students moved from junior high and middle schools to high school;

(3) **Family circumstances**. Any number of salient life events may have affected the home lives of members of the eighth grade cohort;

(4) **Cognitive growth.** NELS:88 measured whether students gained knowledge, and if so how much, between 1988 and 1990 in the areas of mathematics, reading, social studies, and science.

Some of these changes are normative, that is, nearly universally experienced at this given time by the members of an eighth grade cohort. The transition to high school exemplifies this. Other of these changes may happen only to some students and at no set time--say the divorce of one's parents. What all of these kinds of change have in common is that they may affect the current academic performance and later educational and life outcomes of this cohort of students.

What Are Students Experiencing During the Two Years Between Eighth Grade and Tenth?

The question, What are students experiencing during the two years between eighth grade and tenth?, brings several related questions to mind:

- How many 1988 eighth graders were dropouts two years later? What are the characteristics of students who drop out of school; how are they different from those who persist?

- How is the transition to high school experienced? To what degree are students' new high school environments free of crime and violence? Are heavier academic demands being made on students two years later as measured, for example, by more time spent on homework? What changes do students perceive in their learning environment?

- How much stability in family environment did 1988 eighth graders experience over the two year period ending in spring of 1990? What kinds of family changes were members of the eighth grade cohort most likely to experience?

- At what rate are students learning and to what level of cognitive skill do they attain? What is the relationship between the specific coursework that students take (say in mathematics) and their level of achievement?

Who drops out of school? Who remains in school? Looking ahead to the future, almost all of the eighth grade class of 1988 expected to graduate from high school. Two years later, however, by the spring of 1990, over a fifth of a million 1988 eighth graders[1] were no longer enrolled in school. If the National Education Goal of "increasing the high school graduation rate to at least 90 percent" is to be achieved by the year 2000, students who are at risk of dropping out need to be identified early enough that effective interventions can be implemented. In what ways do these dropouts differ from their peers who persist in school?

In general, NELS:88 early-grade dropouts were more likely than their eighth grade classmates to be Hispanic or black, older, grade repeaters, from a family of low socioeconomic status, a family in which the highest level of parental education was less than high school, and a family with a structure other than the traditional two-parent "mother and father" arrangement. Some specific differences and contrasts--centering on the concept of being at risk and on race/ethnicity, socioeconomic status (SES), tested achievement, and gender--may be particularly worth noting.

Students were classified according to the number of "risk factors" (single-parent family, low level of parental educational attainment, limited English proficiency, low family income, siblings who had dropped out, left home alone for more than 3 hours on weekdays) they had in the base year. Two years later, the dropout rate for students with no risk factors was 1.8 percent; for those with 2 or more risk factors, the dropout rate was 15.2 percent.

Hispanics and blacks dropped out at nearly double the rate of Asians and whites. However, *within the lowest SES quartile*, the dropout rate was 14 percent for Hispanics, 12 percent for blacks, 17 percent for whites and 5 percent for Asians. Eighth grade cohort dropouts were more than eight times more likely to come from the lowest SES quartile (58%) than from the highest (7%).

The incidence of dropping out was 26 times greater (13%) for students scoring in the lowest quartile of the 1988 cognitive tests than for students scoring in the highest quartile (0.5%).

There was no significant difference in dropout rates by sex -- males and females were equally likely to drop out. However, males and females gave somewhat different reasons for leaving school. About a third of female dropouts said they left school because of pregnancy. Over half of male dropouts said they left school because they could not get along with teachers; only 17 percent of female dropouts gave this reason.

The most common reason cited (by over half of the eighth grade cohort dropouts) for leaving school was that students didn't like school. Nonetheless, only 4.1 percent of dropouts indicated that they do not intend to complete their education; over 95 percent state that they intend either to return to school for a high school diploma or will secure a GED.

Transition to high school: new schools for old. As of the spring of 1990, the remaining 94 percent of the eighth grade class of 1988 (from the 6 percent who dropped out of school between 1988 and 1990) was enrolled in school either as tenth graders (89%) or as members of some grade other than

[1] The dropout rate is just over six percent and the number of dropouts 183,000, based on questionnaire data from the NELS:88 1988 eligible eighth grade sample. An adjusted dropout rate that includes the 5 percent of students ineligible for the base year survey (owing to problems with their language proficiency or relatively severe mental or physical disabilities) is 6.8 percent, or over 204,000 individuals.

tenth (5%). The most discernable, almost universal, change occurring during this time was the transition from middle school to high school. Some 89 percent of cohort members changed to a new school building for high school, but only 7 percent changed school sectors (moved from a public to private school or vice versa). The low proportion of students who changed sectors reflected eighth grade school attendance patterns--most students attended a public school in eighth grade (89%), and most public school eighth graders remained in public school (98%). Private school eighth graders were more likely to change sectors at this transition point, with Catholic school eighth graders and eighth graders attending other private schools more likely to move to public high school than independent school eighth graders who were equally likely to move to a public school or another type of private school for high school.

In looking back and comparing the first year of high school to the year before, most students recalled having to make some adjustments. The most frequently cited change between eighth grade and high school was in terms of coursework: three out of four cohort members still in school and attending a new school for high school reported that they thought first year high school coursework was more difficult than the year before. Just under one out of five students reported that the social milieu of their new school was more unfriendly and lonely than their eighth grade school.

In the spring of 1990, more than half of the cohort was spending the same amount of time on homework outside of class in high school as in eighth grade. For the other 45 percent, a quarter was spending more time on homework and 15 percent was spending less. Those spending more time on homework reflected the stereotypical "good student": regardless of the subject area--math, science, English or history--females, Asian students, students in the highest SES quartile, and those scoring in the highest quartile on the base year cognitive tests were generally more likely to have stepped up their studying since eighth grade than other groups of students.

Transition to high school: perceptions of the comparative safety of middle and high schools. Despite widespread concern about violence in high schools, the majority of eighth grade cohort members perceived their current high school as safe. Compared to their previous school environment, most perceived their high schools to be just as safe (or unsafe) as their eighth grade school. A small (but statistically significant) proportion of students perceived their new school as safer than their eighth grade school. Behavioral accounts of school crime tended to support students' perceptions of safety. In the move from eighth grade to high school, the frequency of thefts and threats of physical harm decreased slightly, whereas encounters with drug pushers rose. Safety (as measured by reported incidence of crime) appeared to vary according to one's gender, race/ethnicity, score on the base year cognitive tests and whether or not one changed school sectors (changed from a public school to a private school or vice versa). The safety of students who changed from a public eighth grade school to a private high school changed for the better in terms of thefts and threats of physical harm; the reverse was encountered by students who changed from a private eighth grade school to public high school.

Transition to high school: change in learning environment. In addition to school safety, other factors, for example, school policies on rules of proper conduct, the fairness of discipline, and the quality of teacher-student relationships and teacher instruction, also contribute to the creation of an atmosphere that may either inhibit or foster learning. In the move from eighth grade to high school, the eighth grade cohort reported experiencing little discontinuity in learning environment; however, several notable differences were observed. Overall, when change was experienced, it was experienced for the better, with students encountering better teacher-student relationships, better teachers and more school spirit in high school than in eighth grade. However, blacks were more likely than Asians and whites to perceive a change to poorer teacher-student relationships. Similarly, relative to high-SES students, low-SES students

perceived a decline in their learning environment in terms of teacher-student relationships, teacher listening and fairness of discipline. Relative to students scoring in the highest quartile on the base year cognitive tests, students scoring in the lowest quartile also perceived a decline in teacher-student relationships, despite acknowledgement of an improvement in the quality of instruction (teaching and teacher listening).

Stability and change in family life. Whether student or dropout, many members of the eighth grade class of 1988 had experienced some type of family change by spring of 1990. Most commonly experienced were the death or disablement of a close relative (29%) and the move to a new home (19%). Other frequently reported events were the recent employment of their mother, the loss of employment of their father, and, for 8 percent of the cohort, the divorce of their parents.

How much learning takes place between eighth and tenth grade? The NELS:88 achievement battery was designed so that cognitive growth could be reported in two basic ways. *Simple gain scores* measure *how much* improvement took place in math, science, English and social studies (history/citizenship/geography) between 1988 and 1990. In reading and mathematics, *proficiency scores* estimate the probability of student mastery of a particular set of skills. The proficiency scores tell us *where*--that is, in what skills--gains took place.

Between 1988 and 1990, the largest gains were in science and mathematics, with smaller gains in reading and social studies. Total scale score gains averaged about one third to one half of a base year standard deviation in each subject area.

In reading and social studies, subgroup differences in average total scale scores remained relatively stable over time. In science, initial subgroup differences in simple gain scores increased over the two year time interval for all of the subgroups studied. Subgroups, particularly Asians, whites, males and high-SES students, that had scored highest initially on the base year cognitive science test showed the largest gains, while students who had not taken a biology or an advanced science course, and those in the vocational curriculum, fell further behind.

In mathematics, students in most subgroups showed similar amounts of gain with the exception of students in vocational programs and those who reported not taking algebra or a higher level mathematics course; these students gained less than other categories in their respective subgroups.

While simple gains in mathematics remained fairly constant across subgroups, patterns of gains in terms of the skills students were mastering varied across subgroups. The greatest gains in mastery (as reflected in the proficiency scores), both for the population overall and for most subgroups, were in operations on decimals, fractions and roots and simple problem requiring conceptual understanding (levels 2 and 3 out of 4 levels). Subgroup differences in complex problem solving (the highest level skill represented in the test) increased over time. The groups with the highest mastery rates at grade eight made the largest gains in complex problem solving. These groups included Asian and white students and high-SES students, as well as those who took advanced math courses, those in select private schools, and those enrolled in the academic curriculum.

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Appendix A: Standard Errors and Sample *N*s

Table A2.1 Percentage of 1988 eighth graders who dropped out of school by spring of 1990 by selected background characteristics

		Percent Dropping Out
Total	s.e. unwt n	0.48 17,424
Sex		
Male	s.e. unwt n	0.69 8,640
Female	s.e. unwt n	0.58 8,784
Race/Ethnicity		
Asian	s.e. unwt n	1.05 1,056
Hispanic	s.e. unwt n	1.01 2,151
Black	s.e. unwt n	1.93 1,766
White	s.e. unwt n	0.53 12,242
American Indian	s.e. unwt n	2.56 196
Base Year SES Quartile		
Lowest	s.e. unwt n	1.33 703
Second Lowest	s.e. unwt n	0.48 4172
Second Highest	s.e. unwt n	0.94 4187
Highest	s.e. unwt n	0.66 5089

Table A2.1 Percentage of 1988 eighth graders who dropped out of school by spring of 1990 by selected background characteristics (cont'd)

		Percent Dropping Out
Base Year Test Quartile		
Lowest	s.e. unwt n	0.97 3691
Second Lowest	s.e. unwt n	1.06 3841
Second Highest	s.e. unwt n	1.06 4326
Highest	s.e. unwt n	0.10 4933
Base Year Family Composition		
Mother & Father	s.e. unwt n	0.26 11,168
Mother & Male Guardian	s.e. unwt n	1.99 1,962
Father & Female Guardian	s.e. unwt n	0.95 490
Mother only	s.e. unwt n	1.34 2,507
Father only	s.e. unwt n	1.10 493
Other adult	s.e. unwt n	4.46 538
Parent's Education*		
Less than HS	s.e. unwt n	2.47 1,801
HS Graduate	s.e. unwt n	0.67 3,361
Some College	s.e. unwt n	0.58 6,853
College Graduate	s.e. unwt n	0.43 2,604
Advanced Degree	s.e. unwt n	1.52 2,669

* If two parent family, indicates highest education obtained by either parent.

Table A2.1 Percentage of 1988 eighth graders who dropped out of school by spring of 1990 by selected background characteristics (cont'd)

		Percent Dropping Out
Year of Birth		
1972 or before	s.e. unwt n	2.04 892
1973	s.e. unwt n	1.24 5049
1974 or after	s.e. unwt n	0.24 11,162
Repeated a Grade		
Yes	s.e. unwt n	1.60 2589
No	s.e. unwt n	0.42 13,624
Days Absent From School		
0	s.e. unwt n	1.24 2533
1-4 days	s.e. unwt n	0.18 8722
5-15 days	s.e. unwt n	1.09 5044
16 + days	s.e. unwt n	2.58 1057
As of 1990, Expecting or Have a Baby (females only)		
Yes or expecting	s.e. unwt n	5.09 325
No	s.e. unwt n	0.41 16,569

NOTE: Number of days absent from school is based on the first follow-up questionnaire item that asked participants "In the first half of the current school year, about how many days were you absent from school for any reason?"

SOURCE: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Figure A2.1 and Table A2.2
Percentage of 1988 eighth graders who dropped out of school by spring of 1990 by race/ethnicity controlling for socioeconomic status

Race/Ethnicity		Lowest SES Quartile	25-49%	50-75%	Highest SES Quartile
Total	s.e.	1.32	.048	.094	0.66
	unwt n	3,962	4,178	4,189	5,092
Asian	s.e.	2.20	4.44	0.99	0.00
	unwt n	174	212	235	421
Hispanic	s.e.	1.73	1.03	1.58	0.69
	unwt n	1,069	495	356	229
Black	s.e.	2.30	1.51	4.67	9.32
	unwt n	723	475	328	239
White	s.e.	2.23	0.56	0.97	0.18
	unwt n	1,905	2,928	3,219	4,186
American Indian	s.e.	5.21	4.39	2.44	2.07
	unwt n	67	58	43	14

SOURCE: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Table A2.3 Percentage of 1988 eighth graders who dropped out of school and who remained in school by selected background characteristics

		Student	Dropout
Sex			
Male	s.e.	0.63	3.68
	unwt n	16,659	765
Female	s.e.	0.63	3.68
	unwt n	16,659	765
Race/Ethnicity			
Asian	s.e.	0.27	0.66
	unwt n	16,618	760
Hispanic	s.e.	0.68	2.07
	unwt n	16,618	760
Black	s.e.	0.83	1.12
	unwt n	16,618	760
White	s.e.	4.04	4.20
	unwt n	16,618	760
American Indian	s.e.	0.29	0.86
	unwt n	16,618	760
Base Year SES Quartile			
Lowest	s.e.	0.72	3.96
	unwt n	16,621	762
Second Lowest	s.e.	0.61	2.20
	unwt n	16,621	762
Second Highest	s.e.	0.62	3.59
	unwt n	16,621	762
Highest	s.e.	0.86	2.67
	unwt n	16,621	762

Table A2.3 Percentage of 1988 eighth graders who dropped out of school and who remained in school by selected background characteristics (cont'd)

		Student	Dropout
Base Year Family Composition			
Mother & Father	s.e. unwt n	0.73 16,512	3.16 646
Mother & Male Guardian	s.e. unwt n	0.49 16,512	4.46 646
Father & Female Guardian	s.e. unwt n	0.25 16,512	0.62 646
Mother Only	s.e. unwt n	0.47 16,512	3.72 646
Father Only	s.e. unwt n	0.32 16,512	0.65 646
Other Adult	s.e. unwt n	0.30 16,512	3.65 646
Base Year Test Quartile			
Lowest	s.e. unwt n	0.72 16,080	4.21 711
Second Lowest	s.e. unwt n	0.59 16,080	3.80 711
Second Highest	s.e. unwt n	0.61 16,080	4.44 711
Highest	s.e. unwt n	0.73 16,080	0.49 711
Base Year Parent's Education			
Less than HS	s.e. unwt n	0.49 16,541	4.04 747
HS Graduate	s.e. unwt n	0.57 16,541	2.51 747
Some College	s.e. unwt n	0.69 16,541	3.49 747
College Graduate	s.e. unwt n	0.48 16,541	1.03 747
Advance Degree	s.e. unwt n	0.48 16,541	3.28 747

Table A2.3 Percentage of 1988 eighth graders who dropped out of school and who remained in school by selected background characteristics (cont'd)

		Student	Dropout
Year of Birth			
1972 or before	s.e. unwt n	0.24 16,405	2.79 743
1973	s.e. unwt n	0.61 16405	3.70 743
1974 or after	s.e. unwt n	0.65 16,405	2.42 743
Repeated a Grade			
Yes	s.e. unwt n	0.57 15,622	4.46 626
No	s.e. unwt n	0.57 15,622	4.46 626
Days Absent From School			
None	s.e. unwt n	0.48 16,639	2.81 754
1-4 days	s.e. unwt n	0.64 16,639	1.59 754
5-15 days	s.e. unwt n	0.59 16,639	4.11 754
16+ days	s.e. unwt n	0.30 16,639	3.61 754
As of 1990, Expecting or Have a Baby (females only)			
Yes or expecting	s.e. unwt n	0.17 16,454	3.71 761
No	s.e. unwt n	0.17 16,454	3.71 761

SOURCE: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Table A2.4 and Figure A2.2
Reasons given for dropping out of school by sex

		Total	Males	Females
School Reasons				
I didn't like school	s.e. unwt n	3.94 737	5.60 375	5.27 362
I was failing school	s.e. unwt n	4.08 737	6.09 375	4.72 362
I couldn't get along with teachers	s.e. unwt n	4.02 737	5.81 375	2.97 362
I couldn't keep up with my school work	s.e. unwt n	4.14 737	6.33 375	4.80 362
I felt I didn't belong	s.e. unwt n	3.94 737	6.58 375	2.21 362
I couldn't get along with other students	s.e. unwt n	3.22 737	4.30 375	4.87 362
I was suspended too often	s.e. unwt n	2.64 737	3.14 375	4.51 362
I was expelled from school	s.e. unwt n	2.4 737	2.95 375	4.35 362
Changed schools and didn't like new one	s.e. unwt n	2.77 737	3.00 375	4.72 362
I did not feel safe at school	s.e. unwt n	2.64 737	3.01 375	4.49 362
Economic Reasons				
I had to get a job	s.e. unwt n	1.98 737	2.31 375	3.29 362
I found a job	s.e. unwt n	1.97 737	2.94 375	2.61 362
Couldn't work and go to school at the same time	s.e. unwt n	1.70 737	3.07 375	1.63 362
I had to support my family	s.e. unwt n	3.12 737	1.13 375	5.96 362

Table A2.4 and Figure A2.2
Reasons given for dropping out of school by sex (cont'd)

		Total	Males	Females
Family Reasons				
I was pregnant	s.e.	3.48	0.98	6.06
	unwt n	737	375	362
I got married or planned to get married	s.e.	3.11	0.88	5.74
	unwt n	737	375	362
I became a father/mother	s.e.	3.23	1.38	5.84
	unwt n	737	375	362
I had to care for my family	s.e.	2.28	1.37	4.29
	unwt n	737	375	362
I wanted to have a family	s.e.	1.39	1.40	1.97
	unwt n	737	375	362
Personal Reasons				
My friends dropped out of school	s.e.	2.98	4.12	4.39
	unwt n	737	375	362
I wanted to travel	s.e.	0.48	0.72	0.60
	unwt n	737	375	362

SOURCE: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Table A2.5 Percentage of 1988 eighth graders who dropped out of school and who remained in school by "0", "1", or "2 or more" "at-risk" factors

		Student	Dropout
Number of at-risk factors			
Total	s.e. unwt n	0.48 17,424	0.48 17,424
0	s.e. unwt n	0.73 4,833	0.73 4,833
1	s.e. unwt n	0.77 2,296	0.77 2,296
2 or more	s.e. unwt n	1.57 3,102	1.57 3,102

SOURCE: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Figure A3.1 and Table A3.1
Percentages of the longitudinal cohort who attended a particular type of school in eighth grade (1988) by the type of school attended in high school (1990)

		Type of High School Attended in 1990			
		Public	Catholic	Indep.	Priv. Other
Total	s.e.	0.63	0.46	0.20	0.34
	unwt n	16611	16611	16611	16611
Type of Eighth Grade School Attended in 1988					
Public	s.e.	0.29	0.22	0.11	0.16
	unwt n	13677	13677	13677	13677
Catholic	s.e.	3.37	2.93	1.96	0.90
	unwt n	1338	1338	1338	1338
NAIS	s.e.	2.78	1.78	3.87	2.61
	unwt n	1104	1104	1104	1104
Other Private	s.e.	7.92	3.05	0.00	7.91
	unwt n	492	492	492	492

SOURCE: National Education Longitudinal Study of 1988, First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Table A3.2 **Percentages of 1988 eighth graders doing the same, more, or less homework in high school (1990) than in eighth grade (1988) by selected background characteristics**

		Math			Science			English			History		
		No Change	More	Less	No Change	More	Less	No Change	More	Less	No Change	More	Less
Total	s.e.	0.68	0.59	0.58	0.69	0.61	0.53	0.69	0.64	0.55	0.89	0.79	0.63
	unwt n	14960	14960	14960	14178	14178	14178	15189	15189	15189	10433	10433	10433
Sex													
Male	s.e.	0.95	0.82	0.71	0.93	0.82	0.64	1.00	0.91	0.75	1.22	1.07	0.84
	unwt n	7287	7287	7287	6931	6931	6931	7436	7436	7436	5157	5157	5157
Female	s.e.	0.91	0.82	0.80	0.91	0.84	0.74	0.89	0.84	0.75	1.15	1.01	0.83
	unwt n	7633	7673	7673	7247	7247	7247	7753	7753	7753	5276	5276	5276
Race/Ethnicity													
API	s.e.	2.81	2.72	1.71	2.84	2.88	1.32	2.71	2.91	1.34	3.69	3.58	2.23
	unwt n	924	924	924	882	882	882	926	926	926	627	627	627
Hispanic	s.e.	1.97	1.77	1.55	2.14	2.07	1.27	2.14	1.89	1.40	2.61	2.66	1.63
	unwt n	1689	1689	1689	1576	1576	1576	1722	1722	1722	1135	1135	1135
Black	s.e.	2.71	2.09	1.48	2.56	2.06	1.43	2.45	2.23	1.55	3.16	2.90	1.91
	unwt n	1338	1338	1338	1231	1231	1231	1327	1327	1327	867	867	867
White	s.e.	0.77	0.68	0.69	0.77	0.70	0.64	0.76	0.70	0.67	1.04	0.87	0.73
	unwt n	10834	10834	10834	10323	10323	10323	11039	11039	11039	7660	7660	7660
American Indian	s.e.	5.68	4.40	3.40	4.44	4.35	2.26	5.34	4.49	3.74	5.70	5.45	3.63
	unwt n	140	140	140	134	134	134	142	142	142	112	112	112

Table A3.2 **Percentages of 1988 eighth graders doing the same, more, or less homework in high school (1990) than in eighth grade (1988) by selected background characteristics (cont'd)**

		Math			Science			English			History		
		No Change	More	Less	No Change	More	Less	No Change	More	Less	No Change	More	Less
Base Year SES Quartile													
Lowest	s.e.	1.28	0.98	1.11	1.34	1.22	0.95	1.29	1.19	0.88	1.67	1.50	1.04
	unwt n	2924	2924	2924	2684	2684	2684	2978	2978	2978	2031	2031	2031
Second Lowest	s.e.	1.33	1.14	0.98	1.25	1.04	1.01	1.41	1.32	0.98	1.72	1.53	1.21
	unwt n	3494	3494	3494	3304	3304	3304	3581	3581	3581	2436	2436	2436
Second Highest	s.e.	1.26	1.19	0.97	1.28	1.22	0.93	1.27	1.25	0.95	1.43	1.21	1.08
	unwt n	3756	3756	3756	3599	3599	3599	3813	3813	3813	2557	2557	2557
Highest	s.e.	1.28	1.13	1.12	1.27	1.15	0.89	1.21	1.12	1.17	1.49	1.34	1.24
	unwt n	4786	4786	4786	4591	4591	4591	4817	4817	4817	3409	3409	3409
Base Year Test Quartile													
Lowest	s.e.	1.44	1.18	1.05	1.61	1.14	1.19	1.70	1.40	1.49	1.92	1.72	1.16
	unwt n	2611	2611	2611	2397	2397	2397	2664	2664	2664	1838	1838	1838
Second Lowest	s.e.	1.43	1.31	0.96	1.33	1.16	0.85	1.33	1.32	0.87	1.72	1.41	1.37
	unwt n	3187	3187	3187	2992	2992	2992	3279	3279	3279	2213	2213	2213
Second Highest	s.e.	1.14	1.02	1.04	1.21	1.06	1.06	1.21	1.06	0.90	1.47	1.34	1.03
	unwt n	3949	3949	3949	3784	3784	3784	4010	4010	4010	2682	2682	2682
Highest	s.e.	1.17	1.05	1.05	1.18	1.12	0.75	1.11	1.10	0.99	1.57	1.30	1.24
	unwt n	4748	4748	4748	4561	4561	4561	4751	4751	4751	3380	3380	3380

Table A3.2 Percentages of 1988 eighth graders doing the same, more, or less homework in high school (1990) than in eighth grade (1988) by selected background characteristics (cont'd)

		Math			Science			English			History		
		No Change	More	Less	No Change	More	Less	No Change	More	Less	No Change	More	Less
Changed Sectors													
Public to Private	s.e.	6.78	6.18	5.17	7.09	7.17	4.81	6.88	6.72	5.84	8.99	8.67	3.98
	unwt n	62	62	62	60	60	60	63	63	63	45	45	45
Private to Public	s.e.	3.66	2.48	3.73	3.50	2.91	2.16	3.72	2.89	3.85	5.67	3.55	5.04
	unwt n	656	656	656	613	613	613	661	661	661	494	494	494
No Change	s.e.	0.70	0.62	0.59	0.70	0.62	0.54	0.70	0.65	0.55	0.87	0.79	0.61
	unwt n	14211	14211	14211	13477	13477	13477	14434	14434	14434	9873	9873	9873

SOURCE: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Table A3.3 and Figure A3.3
Percentages of 1988 eighth graders reporting that the following acts of school crime occurred the same number, more, or fewer times in their 1990 school than in their 1988 eighth grade school by selected background characteristics

		Had something stolen at school			Someone offered to sell me drugs			Someone threatened to hurt me		
		Same	More Times	Fewer Times	Same	More Times	Fewer Times	Same	More Times	Fewer Times
Total	s.e.	0.71	0.62	0.68	0.63	0.55	0.32	0.69	0.42	0.65
	unwt n	13449	13449	13449	13414	13414	13414	13406	13406	13406
Sex										
Male	s.e.	1.01	0.92	0.91	0.89	0.83	0.37	0.98	0.64	0.99
	unwt n	6615	6615	6615	6597	6597	6597	6594	6594	6594
Female	s.e.	0.95	0.71	0.95	0.76	0.60	0.51	0.86	0.57	0.77
	unwt n	6834	6834	6834	6817	6817	6817	6812	6812	6812
Race/Ethnicity										
API	s.e.	2.65	1.76	2.27	1.95	1.88	0.61	2.69	1.72	1.86
	unwt n	877	877	877	875	875	875	877	877	877
Hispanic	s.e.	1.72	1.65	1.59	1.69	1.27	1.20	1.73	1.18	1.65
	unwt n	1750	1750	1750	1747	1747	1747	1743	1743	1743
Black	s.e.	2.18	2.29	2.40	2.07	1.65	1.46	1.94	0.94	1.87
	unwt n	1409	1409	1409	1395	1395	1395	1397	1397	1397
White	s.e.	0.81	0.69	0.77	0.71	0.65	0.30	0.82	0.53	0.80
	unwt n	9249	9249	9249	9233	9233	9233	9225	9225	9225
American Indian	s.e.	6.84	5.99	4.92	4.29	3.56	2.79	5.19	3.32	4.01
	unwt n	142	142	142	142	142	142	142	142	142

Table A3.3 and Figure A3.3
Percentages of 1988 eighth graders reporting that the following acts of school crime occurred the same number, more, or fewer times in their 1990 school than in their 1988 eighth grade school by selected background characteristics (cont'd)

		Had something stolen at school			Someone offered to sell me drugs			Someone threatened to hurt me		
		Same	More Times	Fewer Times	Same	More Times	Fewer Times	Same	More Times	Fewer Times
Base Year SES Quartile										
Lowest	s.e.	1.60	1.21	1.42	1.29	0.86	1.04	1.46	0.86	1.31
	unwt n	2839	2839	2839	2825	2825	2825	2821	2821	2821
Second Lowest	s.e.	1.42	1.17	1.41	1.21	1.13	0.54	1.41	0.91	1.29
	unwt n	3310	3310	3310	3301	3301	3301	3299	3299	3299
Second Highest	s.e.	1.25	1.03	1.24	1.15	1.06	0.49	1.26	0.88	1.12
	unwt n	3502	3502	3502	3498	3498	3498	3497	3497	3497
Highest	s.e.	1.28	1.24	1.07	0.98	0.87	0.51	1.32	0.66	1.31
	unwt n	3798	3798	3798	3790	3790	3790	3789	3789	3789
Base Year Test Quartile										
Lowest	s.e.	1.66	1.42	1.48	1.56	1.40	0.79	1.57	1.01	1.41
	unwt n	2674	2674	2674	2653	2653	2653	2650	2650	2650
Second Lowest	s.e.	.1.40	1.28	1.32	1.12	1.06	0.50	1.50	0.80	1.48
	unwt n	3090	3090	3090	3084	3084	3084	3080	3080	3080
Second Highest	s.e.	1.34	0.87	1.31	1.15	0.91	0.80	1.28	0.81	1.11
	unwt n	3509	3509	3509	3503	3503	3503	3504	3504	3504
Highest	s.e.	1.37	1.30	1.06	0.90	0.81	0.43	1.10	0.72	0.89
	unwt n	3738	3738	3738	3736	3736	3736	3733	3733	3733

Table A3.3 and Figure A3.3
Percentages of 1988 eighth graders reporting that the following acts of school crime occurred the same number, more, or fewer times in their 1990 school than in their 1988 eighth grade school by selected background characteristics (cont'd)

		Had something stolen at school			Someone offered to sell me drugs			Someone threatened to hurt me		
		Same	More Times	Fewer Times	Same	More Times	Fewer Times	Same	More Times	Fewer Times
School Change										
Public to Private	s.e.	7.10	3.59	7.08	4.99	3.42	4.00	6.79	4.02	6.39
	unwt n	60	60	60	60	60	60	60	60	60
Private to Public	s.e.	3.41	2.37	3.13	2.90	2.89	0.47	2.69	1.85	2.35
	unwt n	694	694	694	692	692	692	693	693	693
No Change	s.e.	0.72	0.63	0.70	0.64	0.57	0.33	0.71	0.42	0.67
	unwt n	12658	12658	12658	12625	12625	12625	12617	12617	12617

SOURCE: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Table A3.4 **Percentages of 1988 eighth graders reporting that the following happened to them at least once in the base year (1988) and first follow-up (1990)**

		Something was stolen from me		Someone threatened me		Was offered drugs	
		BY	F1	BY	F1	BY	F1
Total	s.e.	0.77	0.73	0.71	0.56	0.44	0.61
	unwt n	2474	2507	2475	2500	2474	2501
Sex							
Male	s.e.	1.08	1.01	1.04	0.82	0.59	0.91
	unwt n	1231	1255	1231	1253	1231	1253
Female	s.e.	1.03	0.99	0.91	0.74	0.62	0.65
	unwt n	1242	1252	1244	1247	1244	1249
Race/Ethnicity							
API	s.e.	2.86	2.89	2.09	1.84	0.94	1.95
	unwt n	92	93	92	93	92	93
Hispanic	s.e.	1.92	1.79	1.74	1.32	1.37	1.38
	unwt n	258	266	260	265	260	266
Black	s.e.	2.27	2.39	2.16	1.78	1.46	1.63
	unwt n	327	338	327	335	327	334
White	s.e.	0.90	0.82	0.88	0.67	0.50	0.73
	unwt n	1761	1775	1760	1772	1759	1773
American Indian	s.e.	5.41	5.75	4.25	4.48	3.52	3.50
	unwt n	30	29	30	29	30	29

Table A3.4 **Percentages of 1988 eighth graders reporting that the following happened to them at least once in the base year (1988) and first follow-up (1990) (cont'd)**

		Something was stolen from me		Someone threatened me		Was offered drugs	
		BY	F1	BY	F1	BY	F1
Base Year SES Quartile							
Lowest	s.e.	1.57	1.50	1.49	1.27	1.18	1.04
	unwt n	512	521	512	518	512	518
Second Lowest	s.e.	1.47	1.34	1.37	1.16	0.69	1.16
	unwt n	620	631	619	630	620	630
Second Highest	s.e.	1.33	1.24	1.21	1.04	0.84	1.17
	unwt n	658	668	661	666	660	667
Highest	s.e.	1.37	1.36	1.44	0.96	0.64	0.91
	unwt n	683	687	683	686	682	686
Base Year Test Quartile							
Lowest	s.e.	1.64	1.63	1.49	1.21	1.05	1.47
	unwt n	528	536	527	532	528	532
Second Lowest	s.e.	1.40	1.38	1.45	1.01	0.75	1.19
	unwt n	561	568	561	566	561	567
Second Highest	s.e.	1.31	1.33	1.30	1.17	0.89	1.01
	unwt n	648	654	650	653	650	653
Highest	s.e.	1.34	1.33	1.10	1.00	0.55	0.89
	unwt n	659	662	659	662	659	662

Table A3.4 Percentages of 1988 eighth graders reporting that the following happened to them at least once in the base year (1988) and first follow-up (1990) (cont'd)

		Something was stolen from me		Someone threatened me		Was offered drugs	
		BY	F1	BY	F1	BY	F1
School Change							
Public to Private	s.e.	7.45	6.11	6.77	4.78	4.30	4.31
	unwt n	46	46	46	46	46	46
Private to Public	s.e.	3.80	3.46	2.88	2.63	0.62	2.95
	unwt n	120	119	120	119	120	119
No Change	s.e.	0.78	0.74	0.72	0.57	0.45	0.61
	unwt n	2288	2323	2289	2317	2288	2318

SOURCE: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Table A3.5 Percentages of 1988 eighth graders reporting they now agree or disagree (changed from opposite view held in base year) with the following statement by selected background characteristics

		R doesn't fell safe at school		
		Same	Change to disagree	Change to agree
Total	s.e.	0.54	0.46	0.33
	unwt n	13123	13123	13123
Sex				
Male	s.e.	0.74	0.64	0.43
	unwt n	6470	6470	6470
Female	s.e.	0.71	0.61	0.42
	unwt n	6653	6653	6653
Race/Ethnicity				
API	s.e.	2.60	2.29	1.55
	unwt n	849	849	849
Hispanic	s.e.	1.44	1.14	0.97
	unwt n	1687	1687	1687
Black	s.e.	2.21	2.21	1.11
	unwt n	1347	1347	1347
White	s.e.	0.51	0.40	0.34
	unwt n	9081	9081	9081
American Indian	s.e.	3.89	3.57	1.52
	unwt n	139	139	139
Base Year SES Quartile				
Lowest	s.e.	1.26	1.11	0.64
	unwt n	2742	2742	2742
Second Lowest	s.e.	1.21	1.07	0.70
	unwt n	3236	3236	3236
Second Highest	s.e.	0.87	0.72	0.54
	unwt n	3429	3429	3429
Highest	s.e.	0.78	0.54	0.55
	unwt n	3716	3716	3716

Table A3.5 Percentages of 1988 eighth graders reporting they now agree or disagree (changed from opposite view held in base year) with the following statement by selected background characteristics (cont'd)

		R doesn't fell safe at school		
		Same	Change to disagree	Change to agree
Base Year Test Quartile				
Lowest	s.e.	1.49	1.26	0.89
	unwt n	2566	2566	2566
Second Lowest	s.e.	0.98	0.79	0.67
	unwt n	3013	3013	3013
Second Highest	s.e.	1.06	1.00	0.51
	unwt n	3444	3444	3444
Highest	s.e.	0.61	0.44	0.42
	unwt n	3678	3678	3678
School Change				
Public to Private	s.e.	4.98	4.64	2.31
	unwt n	56	56	56
Private to Public	s.e.	1.77	1.21	1.39
	unwt n	665	665	665
No Change	s.e.	0.56	0.48	0.34
	unwt n	12369	12369	12369

SOURCE: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Table A3.6 **Percentages of students reporting they agree with the following statement about their eighth grade (1988) and first follow-up (1990) schools by selected background characteristics**

		Don't feel safe at school	
		BY	F1
Total	s.e. unwt n	0.55 13516	0.39 13477
Sex			
Male	s.e. unwt n	0.67 6671	0.51 6672
Female	s.e. unwt n	0.81 6845	0.51 6805
Race/Ethnicity			
API	s.e. unwt n	2.25 872	1.62 883
Hispanic	s.e. unwt n	1.34 1769	1.14 1770
Black	s.e. unwt n	2.26 1408	1.40 1446
White	s.e. unwt n	0.53 9303	0.39 9212
American Indian	s.e. unwt n	3.72 142	2.07 145
Base Year SES Quartile			
Lowest	s.e. unwt n	1.57 2865	0.88 2874
Second Lowest	s.e. unwt n	1.10 3329	0.76 3333
Second Highest	s.e. unwt n	0.77 3516	0.64 3498
Highest	s.e. unwt n	0.56 3806	0.49 3372

Table A3.6 Percentages of students reporting they agree with the following statement about their eighth grade (1988) and first follow-up (1990) schools by selected background characteristics (cont'd)

		Don't feel safe at school	
		BY	F1
Base Year Test Quartile			
Lowest	s.e.	1.35	0.91
	unwt n	2704	2703
Second Lowest	s.e.	0.98	0.83
	unwt n	3092	3101
Second Highest	s.e.	1.27	0.60
	unwt n	3524	3490
Highest	s.e.	0.56	0.49
	unwt n	3754	3706

SOURCE: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Table A3.7 Percentages of 1988 eighth graders reporting they now agree or disagree (changed from opposite view held in base year) with the following statements by selected background characteristics (cont'd)

		Teachers are interested in students			Teachers praise effort			Most teachers listen to R		
		Same	Change to disagree	Change to agree	Same	Change to disagree	Change to agree	Same	Change to disagree	Change to agree
Total	s.e.	0.64	0.43	0.57	0.63	0.51	0.52	0.64	0.47	0.61
	unwt n	13119	13119	13119	13191	13191	13191	13259	13259	13259
Sex										
Male	s.e.	0.92	0.61	0.82	0.90	0.72	0.74	0.99	0.65	0.93
	unwt n	6469	6469	6469	6510	6510	6510	6485	6485	6485
Female	s.e.	0.87	0.59	0.78	0.89	0.73	0.74	0.86	0.62	0.73
	unwt n	6650	6650	6650	6681	6681	6681	6674	6674	6674
Race/Ethnicity										
API	s.e.	2.16	1.49	1.55	2.50	2.49	1.66	3.05	3.16	2.22
	unwt n	850	850	850	856	856	856	847	847	847
Hispanic	s.e.	1.61	1.25	1.42	1.80	1.29	1.66	1.89	1.51	1.54
	unwt n	1701	1701	1701	1709	1709	1709	1698	1698	1698
Black	s.e.	2.27	1.26	2.02	2.21	1.36	2.09	2.49	1.24	2.33
	unwt n	1361	1361	1361	1358	1358	1358	1366	1366	1366
White	s.e.	0.73	0.50	0.66	0.71	0.61	0.57	0.75	0.54	0.69
	unwt n	9048	9048	9048	9108	9108	9108	9108	9108	9108
Am. Indian	s.e.	5.98	2.50	4.27	6.13	5.23	4.55	4.90	2.92	5.29
	unwt n	141	141	141	140	140	140	143	143	143

Table A3.7 Percentages of 1988 eighth graders reporting they now agree or disagree (changed from opposite view held in base year) with the following statements by selected background characteristics (cont'd)

		Teachers are interested in students			Teachers praise effort			Most teachers listen to R		
		Same	Change to disagree	Change to agree	Same	Change to disagree	Change to agree	Same	Change to disagree	Change to agree
Base Year SES Quartile										
Lowest	s.e.	1.26	0.90	1.06	1.34	1.03	1.10	1.38	1.01	1.31
	unwt n	2740	2740	2740	2752	2752	2752	2579	2579	2579
Second Lowest	s.e.	1.24	0.78	1.13	1.37	1.11	1.17	1.35	0.83	1.32
	unwt n	3245	3245	3245	3267	3267	3267	3250	3250	3250
Second Highest	s.e.	1.20	0.93	1.02	1.31	1.10	1.04	1.26	1.00	0.96
	unwt n	3431	3431	3431	3441	3441	3441	3431	3431	3431
Highest	s.e.	1.29	0.77	1.14	1.18	0.93	0.97	1.17	0.69	1.10
	unwt n	3703	3703	3703	3731	3731	3731	3719	3719	3719
Base Year Test Quartile										
Lowest	s.e.	1.65	1.00	1.64	1.59	1.22	1.29	1.66	1.11	1.63
	unwt n	2574	2574	2574	2591	2591	2591	2593	2593	2593
Second Lowest	s.e.	1.24	0.83	1.01	1.26	1.03	1.02	1.33	0.95	1.17
	unwt n	3012	3012	3012	3035	3035	3035	3023	3023	3023
Second Highest	s.e.	1.07	0.72	0.93	1.19	0.93	1.06	1.20	0.83	1.06
	unwt n	3433	3433	3433	3454	3454	3454	3444	3444	3444
Highest	s.e.	1.06	0.70	0.92	1.14	0.89	0.83	1.10	0.75	1.86
	unwt n	3675	3675	3675	3691	3691	3691	3676	3676	3676

Table A3.7 Percentages of 1988 eighth graders reporting they now agree or disagree (changed from opposite view held in base year) with the following statements by selected background characteristics (cont'd)

		Teachers are interested in students			Teachers praise effort			Most teachers listen to R		
		Same	Change to disagree	Change to agree	Same	Change to disagree	Change to agree	Same	Change to disagree	Change to agree
School Change										
Public to Private	s.e.	6.28	3.59	5.57	7.41	5.36	7.07	6.58	3.27	6.38
	unwt n	58	58	58	57	57	57	57	57	57
Private to Public	s.e.	3.19	2.22	2.68	2.55	2.30	2.34	2.69	2.31	1.70
	unwt n	667	667	667	668	668	668	671	671	671
No Change	s.e.	0.66	0.43	0.60	0.64	0.52	0.52	0.68	0.47	0.64
	unwt n	12360	12360	12360	12432	12432	12432	12397	12397	12397

Source: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Table A3.7 Percentages of 1988 eighth graders reporting they now agree or disagree (changed from opposite view held in base year) with the following statements by selected background characteristics

		Students get along well with teachers			There is a real school spirit			Discipline is fair			The teaching is good at the school		
		Same	Change to disagree	Change to agree	Same	Change to disagree	Change to agree	Same	Change to disagree	Change to agree	Same	Change to disagree	Change to agree
Total	s.e.	0.67	0.47	0.61	0.74	0.55	0.72	0.71	0.53	0.63	0.62	0.41	0.54
	unwt n	13276	13276	13276	13243	13243	13243	13088	13088	13088	13155	13155	13155
Sex													
Male	s.e.	0.99	0.60	0.91	1.04	0.63	1.00	0.99	0.70	0.87	0.96	0.62	0.83
	unwt n	6551	6551	6551	6524	6524	6524	6452	6452	6452	6478	6478	6478
Female	s.e.	0.88	0.68	0.81	0.96	0.80	0.86	0.97	0.75	0.86	0.76	0.52	0.65
	unwt n	6725	6725	6725	6719	6719	6719	6636	6636	6636	6677	6677	6677
Race/Ethnicity													
API	s.e.	2.35	1.52	2.13	2.02	2.02	1.75	2.31	1.64	1.94	2.14	1.21	2.25
	unwt n	864	864	864	857	857	857	849	849	849	850	850	850
Hispanic	s.e.	1.63	1.29	1.49	1.74	1.43	1.68	1.69	1.33	1.51	1.38	1.07	1.25
	unwt n	1721	1721	1721	1720	1720	1720	1702	1702	1702	1699	1699	1699
Black	s.e.	2.28	1.60	2.08	2.09	1.55	1.85	2.72	1.91	2.52	2.46	0.99	2.37
	unwt n	1383	1383	1383	1371	1371	1371	1339	1339	1339	1357	1357	1357
White	s.e.	0.74	0.50	0.68	0.87	0.62	0.87	0.81	0.62	0.70	0.69	0.52	0.77
	unwt n	9144	9144	9144	9134	9134	9134	9041	9041	9041	9088	9088	9088
American Indian	s.e.	4.03	3.19	4.23	4.50	3.73	3.22	4.49	3.44	3.49	4.14	3.06	2.62
	unwt n	144	144	144	142	142	142	137	137	137	141	141	141

Table A3.7 Percentages of 1988 eighth graders reporting they now agree or disagree (changed from opposite view held in base year) with the following statements by selected background characteristics (cont'd)

		Students get along well with teachers			There is a real school spirit			Discipline is fair			The teaching is good at the school		
		Same	Change to disagree	Change to agree	Same	Change to disagree	Change to agree	Same	Change to disagree	Change to agree	Same	Change to disagree	Change to agree
Base Year SES Quartile													
Lowest	s.e.	1.37	1.05	1.20	1.18	0.87	1.09	1.36	1.21	1.16	1.27	0.66	1.19
	unwt n	2788	2788	2788	2775	2775	2775	2725	2725	2725	2745	2745	2745
Second Lowest	s.e.	1.41	0.89	1.35	1.24	0.84	1.06	1.47	0.97	1.46	1.19	0.79	1.05
	unwt n	3284	3284	3284	3280	3280	3280	3238	3238	3238	3260	3260	3260
Second Highest	s.e.	1.35	0.98	1.15	1.38	1.13	1.26	1.27	1.06	0.96	1.28	1.00	0.91
	unwt n	3463	3463	3463	3452	3452	3452	3412	3412	3412	3436	3436	3436
Highest	s.e.	1.11	0.61	1.05	1.47	0.94	1.41	1.22	0.85	1.17	1.12	0.56	1.07
	unwt n	3741	3741	3741	3736	3736	3736	3713	3713	3713	3714	3714	3714
Base Year Test Quartile													
Lowest	s.e.	1.58	1.13	1.36	1.35	0.87	1.16	1.70	1.11	1.60	1.66	0.88	1.64
	unwt n	2631	2631	2631	2610	2610	2610	2553	2553	2553	2594	2594	2594
Second Lowest	s.e.	1.35	0.80	1.33	1.49	1.05	1.41	1.42	1.08	1.24	1.22	0.91	0.80
	unwt n	3054	3054	3054	3044	3044	3044	3007	3007	3007	3022	3022	3022
Second Highest	s.e.	1.18	0.87	1.00	1.20	0.98	0.92	1.20	1.01	0.94	1.11	0.60	1.04
	unwt n	3469	3469	3469	3469	3469	3469	3428	3428	3428	3439	3439	3469
Highest	s.e.	1.16	0.62	1.11	1.38	0.96	1.38	1.31	0.85	1.16	1.05	0.79	0.84
	unwt n	3695	3695	3695	3694	3694	3694	3680	3680	3680	3683	3683	3683

Table A3.7 Percentages of 1988 eighth graders reporting they now agree or disagree (changed from opposite view held in base year) with the following statements by selected background characteristics (cont'd)

		Students get along well with teachers			There is a real school spirit			Discipline is fair			The teaching is good at the school		
		Same	Change to disagree	Change to agree	Same	Change to disagree	Change to agree	Same	Change to disagree	Change to agree	Same	Change to disagree	Change to agree
School Change													
Public to Private	s.e.	6.19	1.75	6.02	6.40	3.42	6.05	5.70	4.37	4.74	6.91	3.11	6.59
	unwt n	58	58	58	58	58	57	57	57	16	56	56	56
Private to Public	s.e.	3.56	2.89	4.17	3.75	2.44	4.90	4.12	2.21	4.90	3.02	2.73	1.66
	unwt n	673	673	673	673	673	664	664	664	194	673	673	673
No Change	s.e.	0.68	0.46	0.62	0.74	0.56	0.70	0.71	0.55	0.60	0.64	0.42	0.56
	unwt n	12511	12511	12511	12479	12479	12479	12334	12334	12334	12392	12392	12392

Source: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Table A3.8 Percentages of 1988 eighth graders who reported they agree or strongly agree with the following statements about their eighth grade school (1988) and first follow-up (1990)

		Students get along well with teachers		There is real school spirit		Discipline is fair		Teaching is good		Teachers are interested in students		Teachers praise effort		Most teachers listen to what R says	
		BY	F1	BY	F1	BY	F1	BY	F1	BY	F1	BY	F1	BY	F1
Total	s.e.	0.78	0.63	0.89	0.74	0.74	0.62	0.62	0.52	0.71	0.57	0.75	0.69	0.77	0.64
	unwt n	13612	13536	13525	13525	13509	13442	13525	13500	13507	13476	13553	13508	13530	13492
Sex															
Male	s.e.	1.06	0.83	1.09	0.90	1.00	0.86	0.90	0.76	0.97	0.82	1.02	0.99	1.09	0.94
	unwt n	6718	6708	6703	6695	6670	6652	6670	6681	6673	6668	6683	6699	6669	6683
Female	s.e.	1.02	0.86	1.13	1.01	0.99	0.84	0.75	0.62	0.92	0.77	1.01	0.91	0.94	0.79
	unwt n	6894	6828	6888	6830	6839	6790	6855	6819	6834	6808	6807	6809	6861	6809
Race/Ethnicity															
API	s.e.	2.47	1.82	2.57	2.67	2.27	2.05	2.73	1.39	2.31	1.88	2.79	2.55	2.76	2.91
	unwt n	884	887	876	887	873	881	872	884	873	884	877	885	870	883
Hispanic	s.e.	1.97	1.65	2.18	1.92	1.68	1.57	1.55	1.08	1.56	1.55	1.84	1.70	1.83	1.67
	unwt n	1788	1786	1789	1783	1773	1777	1773	1777	1777	1775	1780	1780	1771	1776
Black	s.e.	2.16	1.87	2.41	1.98	2.52	2.07	2.39	1.29	2.30	1.82	2.26	2.30	2345	1.76
	unwt n	1431	1459	1422	1455	1407	1436	1411	1452	1412	1451	1416	1447	1419	1448
White	s.e.	0.91	0 72	1.03	0.86	0.86	0.75	0.66	0.65	0.81	0.68	0.86	0.77	0.88	0.75
	unwt n	9341	9237	9338	9234	9291	9185	9304	9220	9280	9201	9316	9229	9303	9218
American Indian	s.e.	5.46	3.58	5.43	4.62	4.61	3.94	3.86	4.21	4.39	3.03	4.66	6.17	4.34	5.31
	unwt n	146	146	145	143	143	142	143	146	144	145	142	146	145	146

Table A3.8 Percentages of 1988 eighth graders who reported they agree or strongly agree with the following statements about their eighth grade school (1988) and first follow-up (1990) (cont'd)

		Students get along well with teachers		There is real school spirit		Discipline is fair		Teaching is good		Teachers are interested in students		Teachers praise effort		Most teachers listen to what R says	
		BY	F1	BY	F1	BY	F1	BY	F1	BY	F1	BY	F1	BY	F1
Base Year SES Quartile															
Lowest	s.e.	1.70	1.32	1.57	1.33	1.60	1.39	1.29	0.90	1.44	1.32	1.63	1.41	1.58	1.25
	unwt n	2895	2892	2885	2887	2885	2864	2865	2877	2865	2868	2875	2871	2873	2878
Second Lowest	s.e.	1.40	1.21	1.36	1.21	1.47	1.22	1.19	0.98	1.28	1.09	1.42	1.39	1.46	1.16
	unwt n	3357	3353	3356	3350	3338	3325	3335	3350	3331	3339	3244	3349	3334	3339
Second Highest	s.e.	1.37	1.24	1.51	1.32	1.18	1.18	1.03	1.08	1.27	1.16	1.28	1.35	1.33	1.30
	unwt n	3536	3512	3526	3513	3505	3490	3518	3504	3514	3502	3518	3510	3512	3505
Highest	s.e.	1.19	0.89	1.43	1.27	1.28	1.04	1.09	0.80	1.23	0.93	1.28	1.26	1.26	1.03
	unwt n	3824	3779	3824	3775	3811	3763	3807	3769	3797	3767	3816	3778	3811	3770
Base Year Test Quartile															
Lowest	s.e.	1.51	1.43	1.41	1.29	1.56	1.32	1.63	1.05	1.63	1.26	1.56	1.49	1.69	140
	unwt n	2748	2727	2735	2717	2699	2691	2721	2715	2714	2700	2723	2708	2718	2710
Second Lowest	s.e.	1.57	1.23	1.56	1.39	1.35	1.33	1.07	1.09	1.38	1.14	0.38	1.47	1.54	1.31
	unwt n	3119	3114	3115	3109	3094	3092	3096	3105	3088	3103	3106	3109	2099	3102
Second Highest	s.e.	1.33	1.01	1.39	1.23	1.37	1.19	1.09	0.83	1.20	1.09	1.47	1.24	1.39	1.08
	unwt n	3542	3496	3541	3499	3521	3476	3521	3488	3519	3482	3528	3497	3525	3490
Highest	s.e.	1.19	0.87	1.45	1.25	1.24	0.99	0.90	0.88	1.05	0.91	1.17	1.25	1.16	1.13
	unwt n	3760	3718	3757	3720	3753	3710	3750	3715	3746	3712	3756	3718	3748	3711

Source: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

173

Figures A4.1, A4.3, A4.5
Mathematics Total Scale Score
Means and Gains by Selected Background Characteristics

		GAIN: 1988 TO 1990			1988 SCORE STATISTICS			1990 SCORE STATISTICS		
SUBGROUP	SAMPLE SIZE	MEAN	S.D.	S.E.	MEAN	S.D.	S.E.	MEAN	S.D.	S.E.
Total Sample	15315	5.173	6.740	0.131	31.361	11.280	0.219	36.534	12.073	0.234
Racial/Ethnic Groups:										
Asian	940	5.672	6.658	0.521	35.308	11.562	0.905	40.981	12.154	0.951
Hispanic	1755	5.387	6.552	0.375	26.250	9.601	0.550	31.638	10.832	0.621
Black	1471	5.083	6.470	0.405	24.302	9.423	0.590	29.385	10.658	0.667
White	10968	5.159	6.813	0.156	33.137	11.039	0.253	38.296	11.751	0.269
Gender Groups:										
Male	7561	5.202	7.091	0.196	31.485	11.450	0.316	36.687	12.367	0.341
Female	7754	5.143	6.371	0.174	31.237	11.106	0.303	36.380	11.770	0.321
SES Quartiles:										
SESQ1 (Low Quartile)	3138	4.551	6.836	0.293	24.969	9.194	0.394	29.520	10.663	0.457
SESQ2	3663	5.149	6.746	0.268	28.991	10.252	0.407	34.140	11.423	0.453
SESQ3	3807	5.371	6.919	0.269	32.039	10.739	0.418	37.410	11.412	0.444
SESQ4 (High Quartile)	4707	5.469	6.455	0.226	37.605	10.736	0.376	43.074	10.621	0.372

SOURCE: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Figures A4.7, A4.9, A4.11
Mathematics Total Scale Score
Means and Gains by Selected Background Characteristics

		GAIN: 1988 TO 1990			1988 SCORE STATISTICS			1990 SCORE STATISTICS		
SUBGROUP	**SAMPLE SIZE**	**MEAN**	**S.D.**	**S.E.**	**MEAN**	**S.D.**	**S.E.**	**MEAN**	**S.D.**	**S.E.**
Courses Taken:										
Low Level Math	3367	3.240	6.684	0.276	22.389	7.973	0.330	25.630	8.861	0.366
Algebra 1/Geometry	7891	5.966	6.877	0.186	32.067	9.467	0.256	38.033	10.061	0.272
Advanced Math	3984	5.474	6.062	0.230	39.191	11.354	0.432	44.665	10.814	0.411
Type of School Attended:										
Public	13162	5.122	6.772	0.142	30.869	11.272	0.236	35.991	12.109	0.253
Catholic	883	6.121	6.296	0.508	34.818	10.057	0.812	40.939	10.175	0.822
NAIS Private	905	3.965	5.408	0.431	43.200	10.604	0.846	47.165	10.761	0.858
Curriculum Type:										
General	6143	5.259	6.755	0.207	30.427	10.535	0.323	35.685	11.487	0.352
Vocational	1337	3.991	7.130	0.468	24.548	9.207	0.604	28.539	10.853	0.712
Academic	5581	5.875	6.486	0.208	36.820	10.660	0.342	42.696	10.169	0.327

SOURCE: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Figures A4.2, A4.4, A4.6
Mathematics Probability of Proficiency, Level 1
Means and Gains by Selected Background Characteristics

		GAIN: 1988 TO 1990			1988 SCORE STATISTICS			1990 SCORE STATISTICS		
SUBGROUP	SAMPLE SIZE	MEAN	S.D.	S.E.	MEAN	S.D.	S.E.	MEAN	S.D.	S.E.
Total Sample	15315	0.062	0.220	0.004	0.835	0.258	0.005	0.898	0.210	0.004
Racial/Ethnic Groups:										
Asian	940	0.034	0.157	0.012	0.896	0.201	0.016	0.930	0.177	0.014
Hispanic	1755	0.112	0.251	0.014	0.748	0.298	0.017	0.861	0.219	0.013
Black	1471	0.135	0.270	0.017	0.677	0.316	0.020	0.812	0.261	0.016
White	10968	0.044	0.203	0.005	0.873	0.226	0.005	0.918	0.193	0.004
Gender Groups:										
Male	7561	0.059	0.238	0.007	0.833	0.264	0.007	0.893	0.221	0.006
Female	7754	0.065	0.200	0.005	0.838	0.252	0.007	0.903	0.198	0.005
SES Quartiles:										
SESQ1 (Low Quartile)	3138	0.100	0.265	0.111	0.714	0.307	0.013	0.814	0.261	0.011
SESQ2	3663	0.074	0.239	0.009	0.806	0.270	0.011	0.880	0.223	0.009
SESQ3	3807	0.055	0.213	0.008	0.859	0.238	0.009	0.914	0.196	0.008
SESQ4 (High Quartile)	4707	0.031	0.157	0.006	0.929	0.069	0.006	0.959	0.132	0.005

SOURCE: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Figures A4.8, A4.10, A4.12
Mathematics Probability of Proficiency, Level 1
Means and Gains by Selected Background Characteristics

		GAIN: 1988 TO 1990			1988 SCORE STATISTICS			1990 SCORE STATISTICS		
SUBGROUP	**SAMPLE SIZE**	**MEAN**	**S.D.**	**S.E.**	**MEAN**	**S.D.**	**S.E.**	**MEAN**	**S.D.**	**S.E.**
Courses Taken:										
Low Level Math	3367	0.112	0.311	0.013	0.640	0.323	0.013	0.752	0.285	0.012
Algebra 1/Geometry	7891	0.053	0.191	0.005	0.886	0.199	0.055	0.939	0.153	0.004
Advanced Math	3984	0.030	0.142	0.005	0.930	0.175	0.007	0.960	0.140	0.005
Type of School Attended:										
Public	13162	0.065	0.225	0.005	0.826	0.264	0.006	0.891	0.216	0.005
Catholic	883	0.053	0.166	0.013	0.907	0.188	0.015	0.960	0.112	0.009
NAIS Private	905	-0.005	0.117	0.009	0.949	0.167	0.013	0.943	0.220	0.018
Curriculum Type:										
General	6143	0.067	0.225	0.007	0.834	0.254	0.008	0.901	0.198	0.006
Vocational	1337	0.086	0.281	0.018	0.697	0.315	0.021	0.783	0.285	0.019
Academic	5581	0.040	0.158	0.005	0.925	0.167	0.005	0.965	0.115	0.004

SOURCE: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Figures A4.2, A4.4, A4.6
Mathematics Probability of Proficiency, Level 2
Means and Gains by Selected Background Characteristics

		GAIN: 1988 TO 1990			1988 SCORE STATISTICS			1990 SCORE STATISTICS		
SUBGROUP	**SAMPLE SIZE**	**MEAN**	**S.D.**	**S.E.**	**MEAN**	**S.D.**	**S.E.**	**MEAN**	**S.D.**	**S.E.**
Total Sample	15315	0.159	0.295	0.006	0.470	0.417	0.008	0.629	0.414	0.008
Racial/Ethnic Groups:										
Asian	940	0.150	0.293	0.023	0.600	0.411	0.032	0.750	0.382	0.030
Hispanic	1755	0.182	0.299	0.017	0.282	0.359	0.021	0.464	0.413	0.024
Black	1471	0.160	0.291	0.018	0.231	0.344	0.021	0.391	0.408	0.026
White	10968	0.157	0.295	0.007	0.532	0.413	0.009	0.689	0.394	0.009
Gender Groups:										
Male	7561	0.154	0.298	0.008	0.474	0.418	0.012	0.628	0.416	0.011
Female	7754	0.163	0.291	0.008	0.465	0.416	0.011	0.629	0.411	0.011
SES Quartiles:										
SESQ1 (Low Quartile)	3138	0.158	0.301	0.013	0.240	0.340	0.015	0.398	0.407	0.017
SESQ2	3663	0.171	0.298	0.012	0.338	0.395	0.016	0.559	0.417	0.017
SESQ3	3807	0.171	0.304	0.012	0.498	0.409	0.016	0.669	0.395	0.015
SESQ4 (High Quartile)	4707	0.137	0.275	0.010	0.687	0.383	0.013	0.824	0.321	0.011

SOURCE: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Figures A4.8, A4.10, A4.12
Mathematics Probability of Proficiency, Level 2
Means and Gains by Selected Background Characteristics

		GAIN: 1988 TO 1990			1988 SCORE STATISTICS			1990 SCORE STATISTICS		
SUBGROUP	SAMPLE SIZE	MEAN	S.D.	S.E.	MEAN	S.D.	S.E.	MEAN	S.D.	S.E.
Courses Taken:										
Low Level Math	3367	0.094	0.267	0.011	0.152	0.273	0.011	0.245	0.335	0.014
Algebra 1/Geometry	7891	0.207	0.313	0.008	0.505	0.395	0.011	0.712	0.368	0.010
Advanced Math	3984	0.124	0.261	0.010	0.724	0.378	0.014	0.848	0.307	0.012
Type of School Attended:										
Public	13162	0.159	0.297	0.006	0.451	0.416	0.009	0.610	0.418	0.009
Catholic	883	0.168	0.268	0.022	0.615	0.390	0.032	0.782	0.338	0.027
NAIS Private	905	0.069	0.209	0.017	0.839	0.317	0.025	0.908	0.247	0.020
Curriculum Type:										
General	6143	0.171	0.301	0.009	0.437	0.405	0.012	0.607	0.412	0.013
Vocational	1337	0.134	0.298	0.020	0.230	0.336	0.022	0.363	0.401	0.026
Academic	5581	0.160	0.284	0.009	0.662	0.387	0.012	0.821	0.315	0.010

SOURCE: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Figures A4.2, A4.4, A4.6
Mathematics Probability of Proficiency, Level 3
Means and Gains by Selected Background Characteristics

		GAIN: 1988 TO 1990			1988 SCORE STATISTICS			1990 SCORE STATISTICS		
SUBGROUP	**SAMPLE SIZE**	**MEAN**	**S.D.**	**S.E.**	**MEAN**	**S.D.**	**S.E.**	**MEAN**	**S.D.**	**S.E.**
Total Sample	15315	0.176	0.292	0.006	0.290	0.381	0.007	0.466	0.432	0.008
Racial/Ethnic Groups:										
Asian	940	0.211	0.322	0.025	0.415	0.422	0.033	0.626	0.421	0.033
Hispanic	1755	0.150	0.274	0.016	0.134	0.275	0.016	0.284	0.379	0.022
Black	1471	0.121	0.258	0.016	0.107	0.245	0.015	0.228	0.350	0.022
White	10968	0.188	0.298	0.007	0.338	0.394	0.009	0.526	0.429	0.010
Gender Groups:										
Male	7561	0.178	0.297	0.008	0.295	0.384	0.011	0.474	0.436	0.012
Female	7754	0.174	0.288	0.008	0.285	0.378	0.010	0.458	0.427	0.012
SES Quartiles:										
SESQ1 (Low Quartile)	3138	0.121	0.262	0.011	0.108	0.246	0.011	0.230	0.348	0.015
SESQ2	3663	0.173	0.290	0.011	0.206	0.327	0.013	0.378	0.414	0.016
SESQ3	3807	0.198	0.305	0.012	0.298	0.377	0.015	0.496	0.426	0.017
SESQ4 (High Quartile)	4707	0.199	0.299	0.010	0.494	0.415	0.015	0.693	0.390	0.014

SOURCE: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Figures A4.8, A4.10, A4.12
Mathematics Probability of Proficiency, Level 3
Means and Gains by Selected Background Characteristics

		GAIN: 1988 TO 1990			1988 SCORE STATISTICS			1990 SCORE STATISTICS		
SUBGROUP	SAMPLE SIZE	MEAN	S.D.	S.E.	MEAN	S.D.	S.E.	MEAN	S.D.	S.E.
Courses Taken:										
Low Level Math	3367	0.050	0.191	0.008	0.056	0.177	0.007	0.106	0.244	0.010
Algebra 1/Geometry	7891	0.236	0.318	0.009	0.277	0.351	0.009	0.513	0.410	0.011
Advanced math	3984	0.178	0.280	0.011	0.562	0.424	0.016	0.740	0.378	0.014
Type of School Attended:										
Public	13162	0.172	0.291	0.006	0.276	0.375	0.008	0.448	0.431	0.009
Catholic	883	0.225	0.321	0.026	0.389	0.395	0.032	0.614	0.406	0.033
NAIS Private	905	0.104	0.218	0.017	0.730	0.381	0.030	0.834	0.327	0.026
Curriculum Type:										
General	6143	0.183	0.296	0.009	0.248	0.354	0.011	0.431	0.422	0.013
Vocational	1337	0.112	0.261	0.017	0.101	0.236	0.016	0.213	0.348	0.023
Academic	5581	0.215	0.309	0.010	0.461	0.414	0.013	0.676	0.394	0.013

SOURCE: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Figures A4.2, A4.4, A4.6
Mathematics Probability of Proficiency, Level 4
Means and Gains by Selected Background Characteristics

		GAIN: 1988 TO 1990			1988 SCORE STATISTICS			1990 SCORE STATISTICS		
SUBGROUP	SAMPLE SIZE	MEAN	S.D.	S.E.	MEAN	S.D.	S.E.	MEAN	S.D.	S.E.
Total Sample	15315	0.115	0.215	0.004	0.096	0.218	0.004	0.211	0.319	0.006
Racial/Ethnic Groups:										
Asian	940	0.171	0.242	0.019	0.168	0.281	0.022	0.339	0.382	0.030
Hispanic	1755	0.065	0.163	0.009	0.033	0.124	0.007	0.098	0.222	0.013
Black	1471	0.042	0.130	0.008	0.025	0.111	0.007	0.067	0.180	0.011
White	10968	0.133	0.228	0.005	0.114	0.233	0.005	0.247	0.334	0.008
Gender groups:										
Male	7561	0.123	0.226	0.006	0.101	0.225	0.006	0.224	0.329	0.009
Female	7754	0.107	0.205	0.006	0.091	0.210	0.006	0.199	0.308	0.008
SES quartiles:										
SESQ1 (Low Quartile)	3138	0.044	0.140	0.006	0.025	0.105	0.005	0.069	0.182	0.008
SESQ2	3663	0.089	0.189	0.008	0.054	0.158	0.006	0.143	0.259	0.010
SESQ3	3807	0.119	0.215	0.008	0.091	0.206	0.008	0.210	0.307	0.012
SESQ4 (High Quartile)	4707	0.189	0.258	0.009	0.191	0.291	0.010	0.380	0.378	0.013

SOURCE: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Figures A4.8, A4.10, A4.12
Mathematics Probability of Proficiency, Level 4
Means and Gains by Selected Background Characteristics

		GAIN: 1988 TO 1990			1988 SCORE STATISTICS			1990 SCORE STATISTICS		
SUBGROUP	**SAMPLE SIZE**	**MEAN**	**S.D.**	**S.E.**	**MEAN**	**S.D.**	**S.E.**	**MEAN**	**S.D.**	**S.E.**
Courses Taken:										
Low Level Math	3367	0.014	0.084	0.003	0.012	0.074	0.003	0.026	0.111	0.005
Algebra 1/Geometry	7891	0.121	0.212	0.006	0.063	0.153	0.004	0.184	0.269	0.007
Advanced Math	3984	0.208	0.267	0.010	0.256	0.329	0.013	0.464	0.395	0.015
Type of School Attended:										
Public	13162	0.109	0.210	0.004	0.091	0.215	0.004	0.201	0.312	0.007
Catholic	883	0.176	0.256	0.021	0.108	0.198	0.016	0.284	0.343	0.028
NAIS Private	905	0.217	0.242	0.019	0.363	0.349	0.028	0.580	0.370	0.030
Curriculum Type:										
General	6143	0.103	0.204	0.006	0.071	0.181	0.006	0.174	0.288	0.009
Vocational	1337	0.040	0.121	0.008	0.025	0.112	0.007	0.065	0.175	0.012
Academic	5581	0.181	0.254	0.008	0.173	0.280	0.009	0.354	0.366	0.012

SOURCE: National Education Longitudinal Study of 1988: First Follow-Up Survey, U.S. Department of Education, National Center for Education Statistics.

199

Figures A4.13, A4.15, A4.17
Reading Comprehension Total Scale Score
Means and Gains by Selected Background Characteristics

		GAIN: 1988 TO 1990			1988 SCORE STATISTICS			1990 SCORE STATISTICS		
SUBGROUP	SAMPLE SIZE	MEAN	S.D.	S.E.	MEAN	S.D.	S.E.	MEAN	S.D.	S.E
Total Sample	15341	2.321	5.215	0.101	19.290	7.054	0.137	21.611	7.710	0.149
Racial/Ethnic Groups:										
Asian	950	2.733	5.140	0.400	19.836	7.397	0.576	22.569	7.746	0.603
Hispanic	1757	2.457	4.998	0.286	16.507	5.951	0.341	18.964	6.988	0.400
Black	1474	2.125	4.850	0.303	15.627	6.000	0.375	17.753	7.306	0.457
White	10979	2.336	5.313	0.122	20.305	7.017	0.161	22.642	7.550	0.173
Gender Groups:										
Male	7566	2.343	5.400	0.149	18.538	6.979	0.193	20.881	7.913	0.218
Female	7775	2.298	5.025	0.137	20.041	7.049	0.192	22.339	7.432	0.202
SES Quartiles:										
SESQ1 (Low Quartile)	3148	2.019	5.007	0.214	15.495	5.740	0.246	17.514	6.991	0.299
SESQ2	3669	2.266	5.319	0.211	17.976	6.433	0.255	20.242	7.301	0.289
SESQ3	3810	2.332	5.331	0.207	19.916	6.761	0.263	22.248	7.412	0.288
SESQ4 (High Quartile)	4714	2.584	5.150	0.180	22.717	7.018	0.245	25.302	6.992	0.244

SOURCE: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Figures A4.19, A4.21
Reading Comprehension Total Scale Score
Means and Gains by Selected Background Characteristics

		GAIN: 1988 TO 1990			1988 SCORE STATISTICS			1990 SCORE STATISTICS		
SUBGROUP	SAMPLE SIZE	MEAN	S.D.	S.E.	MEAN	S.D.	S.E.	MEAN	S.D.	S.E
Type of School Attended:										
Public	13191	2.293	5.226	0.109	18.940	6.974	0.146	21.233	7.694	0.161
Catholic	880	2.774	5.114	0.414	21.800	6.613	0.535	24.575	6.619	0.536
NAIS private	908	2.175	4.450	0.354	26.099	6.913	0.551	28.275	7.032	0.560
Curriculum Type:										
General	6151	2.321	5.237	0.160	18.871	6.627	0.203	21.191	7.238	0.221
Vocational	1337	1.631	5.013	0.329	15.059	5.478	0.360	16.690	6.802	0.446
Academic	5585	2.813	5.163	0.166	22.474	6.795	0.218	25.287	6.793	0.218

SOURCE: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Figures A4.14, A4.16, A4.18
Reading Comprehension Probability of Proficiency, Level 1
Means and Gains by Selected Background Characteristics

		GAIN: 1988 TO 1990			1988 SCORE STATISTICS			1990 SCORE STATISTICS		
SUBGROUP	SAMPLE SIZE	MEAN	S.D.	S.E.	MEAN	S.D.	S.E.	MEAN	S.D.	S.E.
Total Sample	15341	0.019	0.270	0.005	0.871	0.266	0.005	0.889	0.261	0.005
Racial/Ethnic Groups:										
Asian	950	0.042	0.247	0.019	0.870	0.270	0.021	0.912	0.233	0.018
Hispanic	1757	0.039	0.294	0.017	0.813	0.309	0.018	0.853	0.291	0.017
Black	1474	0.022	0.336	0.021	0.763	0.333	0.021	0.786	0.344	0.021
White	10979	0.014	0.254	0.006	0.899	0.237	0.005	0.913	0.234	0.005
Gender Groups:										
Male	7566	0.017	0.292	0.008	0.850	0.283	0.008	0.867	0.283	0.008
Female	7775	0.020	0.246	0.007	0.891	0.247	0.007	0.911	0.236	0.006
SES Quartiles:										
SESQ1 (Low Quartile)	3148	0.030	0.326	0.014	0.768	0.333	0.014	0.798	0.331	0.014
SESQ2	3669	0.019	0.301	0.012	0.855	0.274	0.011	0.874	0.276	0.011
SESQ3	3810	0.014	0.263	0.010	0.895	0.243	0.009	0.910	0.238	0.009
SESQ4 (High Quartile)	4714	0.013	0.189	0.007	0.939	0.187	0.007	0.952	0.175	0.006

SOURCE: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Figures A4.20, A4.22
Reading Comprehension Probability of Proficiency, Level 1
Means and Gains by Selected Background Characteristics

		GAIN: 1988 TO 1990			1988 SCORE STATISTICS			1990 SCORE STATISTICS		
SUBGROUP	SAMPLE SIZE	MEAN	S.D.	S.E.	MEAN	S.D.	S.E.	MEAN	S.D.	S.E.
Type of School Attended:										
Public	13191	0.020	0.275	0.006	0.863	0.272	0.006	0.883	0.267	0.006
Catholic	880	0.018	0.221	0.018	0.935	0.191	0.015	0.953	0.168	0.014
NAIS Private	908	0.003	0.103	0.008	0.942	0.218	0.017	0.945	0.217	0.017
Curriculum Type:										
General	6151	0.021	0.275	0.008	0.879	0.252	0.008	0.900	0.245	0.007
Vocational	1337	0.018	0.354	0.023	0.753	0.341	0.022	0.771	0.348	0.023
Academic	5585	0.013	0.186	0.006	0.941	0.181	0.006	0.954	0.173	0.006

SOURCE: National Education Longitudinal Study of 1988: First Follow-Up Survey, U.S. Department of Education, National Center for Education Statistics.

Figures A4.14, A4.16, A4.18
Reading Comprehension Probability of Proficiency, Level 2
Means and Gains by Selected Background Characteristics

		GAIN: 1988 TO 1990			1988 SCORE STATISTICS			1990 SCORE STATISTICS		
SUBGROUP	SAMPLE SIZE	MEAN	S.D.	S.E.	MEAN	S.D.	S.E.	MEAN	S.D.	S.E.
Total Sample	15341	0.125	0.256	0.005	0.381	0.342	0.007	0.506	0.376	0.007
Racial/Ethnic Groups:										
Asian	950	0.139	0.261	0.020	0.408	0.356	0.028	0.547	0.380	0.030
Hispanic	1757	0.130	0.248	0.014	0.243	0.276	0.016	0.373	0.341	0.020
Black	1474	0.113	0.227	0.014	0.211	0.277	0.017	0.324	0.346	0.022
White	10979	0.127	0.262	0.006	0.429	0.345	0.008	0.556	0.370	0.008
Gender Groups:										
Male	7566	0.125	0.263	0.007	0.347	0.335	0.009	0.472	0.381	0.011
Female	7775	0.125	0.248	0.007	0.415	0.346	0.009	0.540	0.367	0.010
SES Quartiles:										
SESQ1 (Low Quartile)	3148	0.107	0.238	0.010	0.201	0.259	0.011	0.308	0.329	0.014
SESQ2	3669	0.126	0.259	0.010	0.313	0.311	0.012	0.438	0.359	0.014
SESQ3	3810	0.125	0.265	0.010	0.412	0.336	0.013	0.537	0.368	0.014
SESQ4 (High Quartile)	4714	0.138	0.257	0.009	0.548	0.345	0.012	0.686	0.340	0.012

SOURCE: National Education Longitudinal Study of 1988. First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Figures A4.14, A4.16, A4.18
Reading Comprehension Probability of Proficiency, Level 2
Means and Gains by Selected Background Characteristics

		GAIN: 1988 TO 1990			1988 SCORE STATISTICS			1990 SCORE STATISTICS		
SUBGROUP	**SAMPLE SIZE**	**MEAN**	**S.D.**	**S.E.**	**MEAN**	**S.D.**	**S.E.**	**MEAN**	**S.D.**	**S.E.**
Type of School Attended:										
Public	13191	0.123	0.256	0.005	0.364	0.337	0.007	0.487	0.375	0.008
Catholic	880	0.152	0.259	0.021	0.506	0.336	0.027	0.658	0.332	0.027
NAIS Private	908	0.081	0.208	0.017	0.724	0.320	0.025	0.805	0.299	0.024
Curriculum Type:										
General	6151	0.128	0.259	0.008	0.355	0.325	0.010	0.482	0.360	0.011
Vocational	1337	0.088	0.237	0.016	0.182	0.245	0.016	0.270	0.318	0.021
Academic	5585	0.150	0.259	0.008	0.537	0.339	0.011	0.687	0.332	0.011

SOURCE: National Education Longitudinal Study of 1988: First Follow-Up Survey, U.S. Department of Education, National Center for Education Statistics.

Figures A4.23, A4.24, A4.25
Science Total Scale Score
Means and Gains by Selected Background Characteristics

		GAIN: 1988 TO 1990			1988 SCORE STATISTICS			1990 SCORE STATISTICS		
SUBGROUP	SAMPLE SIZE	MEAN	S.D.	S.E.	MEAN	S.D.	S.E.	MEAN	S.D.	S.E.
Total Sample	15222	2.279	3.501	0.068	11.730	4.354	0.085	14.009	5.034	0.098
Racial/Ethnic Groups:										
Asian	933	2.758	3.492	0.274	12.198	4.588	0.361	14.956	5.211	0.409
Hispanic	1719	1.826	3.197	0.185	9.840	3.469	0.201	11.666	4.280	0.248
Black	1450	1.384	3.008	0.190	9.083	3.347	0.211	10.467	4.036	0.254
White	10938	2.464	3.587	0.082	12.410	4.348	0.100	14.874	4.900	0.112
Gender Groups:										
Male	7517	2.491	3.662	0.101	12.172	4.594	0.127	14.664	5.267	0.146
Female	7705	2.066	3.319	0.091	11.289	4.052	0.111	13.355	4.701	0.129
SES Quartiles:										
SESQ1 (Low Quartile)	3099	1.705	3.285	0.142	9.532	3.412	0.147	11.237	4.238	0.183
SESQ2	3642	2.020	3.494	0.139	10.974	4.029	0.160	12.995	4.765	0.189
SESQ3	3790	2.304	3.545	0.138	12.059	4.191	0.163	14.362	4.750	0.185
SESQ4 (High Quartile)	4691	2.912	3.520	0.123	13.730	4.465	0.156	16.642	4.705	0.165

SOURCE: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Figures A4.26, A4.27, A4.28
Science Total Scale Score
Means and Gains by Selected Background Characteristics

		GAIN: 1988 TO 1990			1988 SCORE STATISTICS			1990 SCORE STATISTICS		
SUBGROUP	SAMPLE SIZE	MEAN	S.D.	S.E.	MEAN	S.D.	S.E.	MEAN	S.D.	S.E.
Type of School Attended:										
Public	13074	2.219	3.505	0.074	11.606	4.329	0.091	13.825	5.033	0.106
Catholic	883	2.801	3.552	0.287	12.514	4.038	0.326	15.315	4.476	0.361
NAIS Private	901	3.062	3.456	0.276	15.928	4.908	0.392	18.990	4.846	0.388
Curriculum Type:										
General	6102	2.372	3.487	0.107	11.384	4.041	0.124	13.756	4.733	0.145
Vocational	1327	1.598	3.225	0.212	9.518	3.571	0.235	11.117	4.367	0.288
Academic	5556	2.698	3.569	0.115	13.578	4.402	0.142	16.276	4.688	0.151
Courses Taken:										
General Science	2615	1.752	3.375	0.158	9.765	3.739	0.175	11.517	4.467	0.210
Biology	9564	2.372	3.543	0.087	11.800	4.157	0.102	14.172	4.789	0.118
Chemistry/Physics	2567	2.618	3.437	0.163	13.806	4.661	0.221	16.424	5.207	0.247

SOURCE: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Figures A4.29, A4.30, A4.31
History/Citizenship/Geography Total Scale Score
Means and Gains by Selected Background Characteristics

		GAIN: 1988 TO 1990			1988 SCORE STATISTICS			1990 SCORE STATISTICS		
SUBGROUP	SAMPLE SIZE	MEAN	S.D.	S.E.	MEAN	S.D.	S.E.	MEAN	S.D.	S.E.
Total Sample	15089	2.258	3.939	0.077	17.103	5.344	0.104	19.360	5.659	0.111
Racial/Ethnic Groups:										
Asian	924	2.477	3.859	0.305	17.666	5.409	0.427	20.143	5.661	0.447
Hispanic	1695	2.416	4.029	0.235	14.808	5.066	0.295	17.223	5.199	0.303
Black	1434	2.041	3.763	0.238	14.518	4.664	0.296	16.559	5.118	0.324
White	10858	2.261	3.955	0.091	17.844	5.240	0.121	20.105	5.553	0.128
Gender Groups:										
Male	7442	2.301	4.215	0.117	17.514	5.599	0.156	19.815	5.958	0.166
Female	7647	2.214	3.642	0.100	16.693	5.042	0.138	18.907	5.304	0.146
SES Quartiles:										
SESQ1 (Low Quartile)	3073	2.129	4.089	0.177	14.191	4.712	0.204	16.320	5.199	0.225
SESQ2	3604	2.195	3.970	0.159	16.189	4.888	0.195	18.384	5.399	0.216
SESQ3	3763	2.144	3.988	0.156	17.608	5.082	0.199	19.752	5.408	0.212
SESQ4 (High Quartile)	4649	2.515	3.734	0.131	19.598	5.147	0.181	22.114	5.046	0.178

SOURCE: National Education Longitudinal Study of 1988: First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Figures A4.32, A4.33
History/Citizenship/Geography Total Scale Score
Means and Gains by Selected Background Characteristics

		GAIN: 1988 TO 1990			1988 SCORE STATISTICS			1990 SCORE STATISTICS		
SUBGROUP	SAMPLE SIZE	MEAN	S.D.	S.E.	MEAN	S.D.	S.E.	MEAN	S.D.	S.E.
Type of School Attended:										
Public	12959	2.264	3.960	0.083	16.859	5.291	0.112	19.123	5.676	0.120
Catholic	884	2.355	3.757	0.303	19.011	4.950	0.400	21.366	4.640	0.375
NAIS Private	895	1.352	3.855	0.309	22.011	5.600	0.449	23.363	5.335	0.428
Curriculum Type:										
General	6059	2.352	3.966	0.122	16.646	4.909	0.151	18.998	5.297	0.163
Vocational	1315	1.931	4.038	0.267	14.138	4.750	0.314	16.069	5.299	0.351
Academic	5509	2.450	3.664	0.118	19.567	5.054	0.163	22.017	4.930	0.159

SOURCE: National Education Longitudinal Study of 1988. First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Appendix B: Methodological and Technical Notes

B.1 Accuracy of Estimates

The accuracy of reported statistics is determined by the joint effects of sampling and nonsampling errors. Sample surveys such as NELS:88, and universe surveys as well, are subject to nonsampling errors. Nonsampling error may arise from a number of sources, such as the inability to obtain cooperation from a sample member, or the unwillingness or inability of a respondent to answer a given item asked in a survey. In addition, the exclusion of persons who should be included in the universe, variability in providing estimates, differences in interpreting the meaning or intent of questions, and errors in data capture, editing, or coding may also result in nonsampling error. Nonsampling errors in NELS:88 are discussed in the base year and first follow-up user's manuals and technical reports. The overall quality of the base year student questionnaire data is assessed in Kaufman & Rasinski (1991)[1]. Assessments of first follow-up data quality appear in the user's manuals and the *First Follow-Up Final Technical Report*. A base year through second follow-up data quality report will be produced in 1995. The technical report on the quality of 1988, 1990 and 1992 NELS:88 data will address the following issues:

- validity of responses with respect to known values, such as student reports of course-taking as compared to transcript data and students' self-perceptions compared to test scores;
- consistency of responses from different sources, such as parents' and students' perceptions of family attitudes and perceptions of the student and the student's teachers of the student's school performance, and of the school's problems;
- effect size of nonresponse bias for different categories of items;
- measurement error in standardized tests and in school course grades compared to standardized tests;
- reliability of items measured over time and stability of composite constructs over time; and
- separation of reliable change from unreliable variation.

A base year through second follow-up psychometric report will also be released in 1995. The psychometric report will document the development and validation of the NELS:88 achievement battery. It will discuss test specifications, IRT scaling for longitudinal measurement, normative and proficiency scores, and the psychometric properties -- the reliability of the IRT scores and the construct validity of the NELS:88 content areas -- of the tests.

Estimates of sampling variability--expressed as the standard error of measurement--appear in Appendix A, along with sample sizes (unweighted *N*s) for weighted estimates presented in this report.[2] (Although statistics reported in the tables of this report are weighted--that is, are population estimates--sample sizes are critical to determining statistical significance and are therefore reported with the standard

[1] *Quality of the Responses of Eighth-Grade Students in NELS:88*, 1991. Washington, D.C.: National Center for Education Statistics (NCES 91-487). On issues of the general quality of data supplied by high school students, see the analysis of HS&B conducted by Fetters, Stowe and Owings (1984).

[2] Two variance estimation packages were used to calculate Taylor Series approximations of standard errors, C-Tab and SUDAAN. However, standard errors reported for cognitive test results in Chapter 4 are Design Effect-corrected standard errors.

errors). Sampling errors occur because the data are collected from a sample of the population rather than the entire population. The standard error is a measure of the variability due to sampling when estimating a parameter. It indicates how much variance there is in the population of possible estimates of a parameter for a given sample size. Standard errors can be used as a measure of the precision expected from a particular sample.

The sample estimate and an estimate of its standard error permit us to construct interval estimates with prescribed confidence that the interval includes the average result of all possible samples. An interval from two standard deviations below an estimate to two standard deviations above an estimate constitutes a 95 percent confidence interval.

NELS:88 estimates the 1988 eighth-grade public school population at a total that falls somewhat below the number recorded by the NCES Common Core of Data. Among other reasons, this discrepancy is partly a function of the exclusion of certain schools from the NELS:88 base year sampling frame, the exclusion of 5.37 percent of the students in the schools that were included in the sampling frame, and the difference between autumn and spring enrollment figures (fall enrollments tend to be higher--spring enrollment figures reflect attrition within the grade, particularly the impact on enrollment of dropping out). Many of the excluded students--specifically, those whose eligibility status has changed or who were deemed to have been misclassified--have been added into the NELS:88 first and second follow-up samples, though after writing this report, to reflect the results of the Base Year Ineligibles study of the first follow-up, and the Followback Study of Excluded Students of the second follow-up.[3]

B.2 Statistical Procedures

Comparisons that have been drawn in the text of this report have been tested for statistical significance to ensure that the differences are larger than those that might be expected due to sampling variation. The statistical comparisons in this report were based on the *t* statistic. Generally, whether the statistical test is considered significant or not is determined by calculating a *t* value for the difference between a pair of means or proportions and comparing this value to published tables of values at certain critical levels, called "alpha levels." The alpha level is an *a priori* statement of the probability that a difference exists in fact rather than by chance.

To guard against errors of inference based upon multiple comparisons, the Bonferroni procedure[4] to adjust significance tests for multiple contrasts was used. This method corrects the significance (or alpha) level for the total number of contrasts made with a particular classification variable. For each classification variable, there are (K*[K-1])/2 possible contrasts (or nonredundant pairwise comparisons), where K is the

[3] Some 314 base year ineligibles were classified as eligible for the first follow-up and completed a first follow-up questionnaire. These cases were integrated into the first follow-up samples--the 1990 sophomore cross-sectional sample, the full first follow-up to second follow-up longitudinal sample, and the 1990 sophomore longitudinal sample--at the time of the second follow-up data release. However, since base year ineligibles did not complete a base year questionnaire, they have not been integrated into the eighth-grade longitudinal sample (either the base year to first follow-up longitudinal sample or base year to first follow-up to second follow-up longitudinal sample, and hence, are not included in this reports' analysis of the 1988 eighth grade longitudinal cohort two years later). (One criterion for inclusion in the eighth grade panel samples is completion of a questionnaire in the base year and first follow-up or all three waves of the study, base year, first follow-up and second follow-up.) For further information on the integration of base year ineligibles into the second follow-up re-release of first follow-up data, see the *NELS:88 Second Follow-Up Student Component Data File User's Manual*.

[4] For detailed discussion, see, for example, Hays, W.L. (1988). *Statistics*. (4th ed.) New York: Holt, Rinehart, Winston.

number of categories. For example, if a classification variable has four categories, K=4 and there are (4*3)/2=6 possible comparisons between the categories, the Bonferroni procedure divides the alpha-level for a single *t*-test (for example, 0.05) by the number of possible pairwise comparisons to derive a new alpha corrected for the fact that multiple contrasts are being made.

Interested readers can compute the *t* statistic between estimates from various subgroups presented in the tables using the following formula:

$$t = \frac{X_1 - X_2}{\sqrt{SE_1^2 + SE_2^2}}$$

where X_1 and X_2 are the estimates to be compared and SE_1 and SE_2 are their corresponding standard errors.

For example, to test for significant differences in the incidence of dropping out among whites, blacks, and Asians, the following procedures would be implemented:

1. Establish the number of comparisons -- in this case three (whites and blacks; whites and Asians; and blacks and Asians). The number of possible two-way comparisons equals **(K*[K-1])/2** where K is the number of variable categories. Thus, with three categories the number of possible comparisons is ([3][2])/2 = 3.

2. Divide the desired alpha level, 0.05, by the number of comparisons (for example, three) to derive the new alpha (0.05/3 = 0.0166).

3. Consult a table of *t* statistics (or the standard normal table for z values if the N is large) to find the *t* value that corresponds to that alpha (*t* = 2.39 for alpha = 0.0166).

B.3 Analysis Procedures

The combined base year-first follow-up student data files contain several distinct analysis populations. These include:

- Population 1 -- the eighth-grade cohort in 1988;
- Population 2 -- a subsample of the 1988 eighth-grade cohort in 1990; and
- Population 3 -- the sophomore cohort in 1990, comprising all members of population 2 who were enrolled in tenth grade and a sample of freshened 1990 tenth graders who were not in eighth grade in the spring term of 1988.

The results reported here for the **NELS:88 eighth grade longitudinal sample** used the eighth grade to first follow-up panel sample which is a subset of population 2. The eighth grade panel sample is composed of members of the eighth grade cohort who were retained in the first follow-up and who completed both a base year student questionnaire and a first follow-up student or dropout questionnaire (sample *N*=17,424). The analyses employed the special panel flag (**F1PANFLG**--for identifying members

of the eighth grade panel sample) and the eighth grade panel weight (**F1PNLWT**). Both variables can be found on the NELS:88 first follow-up student data file.

Cross-sectional analyses reported in ***A Profile of the American High School Sophomore in 1990*** and in ***America's High School Sophomores: A Ten Year Comparison, 1980-1990*** used the basic first follow-up nonresponse-adjusted weight--**F1QWT**--for students[5] (sample *N*=17,544) enrolled in tenth grade in the spring term of the 1990 school year; students out of grade sequence and dropouts (including dropouts from the freshening sample) were excluded. For details on proper use of weights and flags to define analysis populations in NELS:88, see the ***NELS:88 First Follow-up Student Component Data File User's Manual***.

This document reports univariate distributions and crosstabular (bivariate) analyses. Nevertheless, many of the background variables commonly employed in educational research (race, socioeconomic status, school control type, and so on) are highly related to each other. Readers are cautioned that multivariate analysis, which was not utilized in this report, generally allows for a more appropriate description of interrelationships and causal inference.

B.4 Variables Used

Some variables, both classification or independent variables and outcome or dependent variables, employed in this report were taken directly from the student questionnaire while others have been constructed for analytic purposes. Some of these constructed variables appear on the base year and first follow-up data files for the convenience of data users; others were specially constructed for this report. Below, we discuss first constructed variables, then variables that were taken directly from the questionnaires unaltered. Labels for base year variables begin with BY; for first follow-up student variables with F1S and for first follow-up dropout variables with F1D. (Further information on these variables, including precise item wording, response categories, frequencies, and weighted and unweighted response percents, can be found in the ***NELS:88 First Follow-Up Student Component Data File User's Manual.)***

Constructed Variables

Days Absent From School. This variable is a recategorized version of the first follow-up student questionnaire item F1S13. (This student item, located in the first follow-up student file, contains both student and dropout data.) The student questionnaire "days absent" item and the dropout questionnaire "days absent" item are imperfectly comparable, reflecting enrollment differences as of the spring of 1990.

At-Risk. The constructed variable "at-risk" drew upon five base year student questionnaire items and one base year parent questionnaire item in its construction. The six base year items used were: (1) single parent family (BYFCOMP=4 or 5); low parent education (BYPARED=1); limited English proficiency (BYLEP=1); low family income (BYFAMINC is less than or equal to $14,999); a sibling that is a dropout (BYP6=one or more other children); and home alone more than 3 hours on weekdays (BYS41=4). Each "at-risk" variable was recoded into a dichotomous "factor present"-"factor absent"

[5] The term "student" was defined broadly in the NELS:88 first follow-up as any individual who was receiving academic or vocational instruction, whether in school, at home, in an institution, or through an alternative program. However, many "alternative completers" were not in graded programs with a sophomore status; nonsophomores were excluded from the analyses in this report.

variable. Next, the six new dichotomous variables were summed to form an interim "total" at-risk variable ranging from 0 to 6 at-risk factors. Finally, the "total" at-risk variable was collapsed into three molar categories indicating longitudinal cohort members possessed "0 at-risk factors", "1 at-risk factor" or "2 or more at-risk factors."

School Change. The constructed variable "school change" categorizes students as changing from a public school for eighth grade to a private school for high school ("public to private school change") or changing from a private school in eighth grade to a public school for high school ("private to public school change") or not changing to a different type of school for high school ("no change"). The no change category comprises students who attended a private school both in eighth grade and high school and students who attended a public school both in eighth grade and high school. The composite was created by taking G8CTRL (1=public; 2=Catholic; 3=NAIS; 4=other private) and crossing it by its comparable first follow-up variable, G10CTRL2 (also, 1=Public; 2=Catholic; 3=NAIS; 4=other private), and then, recoding the 16 cell matrix into the aforementioned three categories.

Missing cases (on either of the two variables) were excluded from the analysis.

Change Scores

The basic formula for constructing individual base year to first follow-up change scores was simply:

(First Follow-Up Observation - Base Year Observation = Individual Change Score)

Change in School Crime. In this report change in school crime since eighth grade was examined through three behavioral measures of school crime: "**Had something stolen from me**" (BYS57A and F1S9A); "**Someone offered to sell me drugs**" (BYS57B and F1S9B); and "**Someone threatened to hurt me**" (BYS57C and F1S9C). For each school crime item, in both the base year and first follow-up, students were asked to report if "during the first semester of the current school year" they were the victim of such an act "never" (=0), "once or twice" (=1) or "more than once" (=2).

To investigate if in the move from eighth grade to high school, cohort members encountered the same, more, or fewer occurrences of these three types of school crime, for sample members who made the change to a new school for high school (i.e., as of the spring of 1990 students were attending a school that was different from the school they attended in the spring of 1988), their base year response on each item was subtracted from their first follow-up response on each item. This subtraction process yielded the following results, and hence, were similarly coded: "0" indicating that students' base year and first follow-up experiences were the same; "-1" or "-2" indicating that students' first follow-up experiences were less frequent than their base year experiences; and "1" or "2" indicating that students' first follow-up experiences were more frequent than their base year experiences.

Missing cases were excluded on an item by item basis prior to constructing change scores. Also excluded from analysis were students who, in the spring of 1990, were attending the same school they attended in the spring of 1988 for eighth grade.

Change in School Climate. The seven variables used to assess climate differences between students' eighth grade schools and new high schools were similarly constructed. Similar to the base year and first follow-up school crime items, base year and first follow-up school climate items were strictly

comparable. The seven items and corresponding base year and first follow-up variable names are: "**Students get along well with their teachers**" (BYS59A and F1S7A); "**There is real school spirit**" (BYS59B and F1S7B); "**Discipline is fair**" (BYS59D and F1S7D); "**Teaching is good**" (BYS59F and F1S7G); "**Teachers are interested in students**" (BYS59G and F1S7H); "**When I work hard on my schoolwork, my teachers praise my effort**" (BYS59H and F1S7I); and "**Most of my teachers listen to what I have to say**" (BYS59J and F1S7L). In both the base year and first follow-up students reported they "strongly agreed", "agreed", "disagreed" or "strongly disagreed" with each of the aforementioned statements concerning their current schools' environment.

Construction of change scores followed a three step process: First, the 14 variables (seven base year and seven first follow-up) were transformed into dichotomous variables by collapsing the categories "strongly agree" and "agree" into a single "agree" category (=1) and "disagree" and "strongly disagree" into a single "disagree" category (=2). Second, students' (transformed) base year response on each climate item was subtracted from their (transformed) first follow-up response to each item. Third, change scores were created that reflected the results of step 2. That is, the subtraction process produced three new outcomes or scores and were similarly coded: "0" which indicated no change since the base year; "-1" which indicated in the move from eighth grade to high school students now agreed with the positive statement about their schools' climate; and "1" which indicated that in the move from eighth grade to high school, students' now disagreed with the positive statement made about their high school.

An eighth change score based on the climate item **"I don't feel safe at school"** (BYS59K and F1S7M) was similarly constructed. However, because this item is worded opposite of the other seven climate items examined, the meaning of the resulting new scores of "-1" and "1" were reversed with "-1" indicating that in the move from eighth grade to high school students' now disagreed with the statement made about their high school and "1" indicating in the move from eighth grade to high school students now agreed with the statement about their schools' climate.

Missing cases were excluded on an item-by-item basis prior to constructing change scores. Also excluded from analyses of school climate were students who, in the spring of 1990, were attending the same school they attended in the spring of 1988 for eighth grade.

Change in the Amount of Time Spent on Homework. Unlike the school climate and crime change scores described above, base year to first follow-up homework change scores were more difficult to construct because the homework items were not strictly comparable. The two sets of homework items (math-BYS79A; science-BYS79B; English-BYS79C; history-BYS79D and math-F1S36B1; science-F1S36C1; English-F1S36D1 and history-F1S36E1) differed in two ways: First, the response categories of the two sets of homework items differed. Second, unlike the base year question, the first follow-up question asked students to report separately how much time they spent on homework out of school and in school. The base year and first follow-up homework items are shown in Table 1. (Note, homework items in a set asked the same question--how much time do you spend studying in four subject areas: math, science, English and history.)

The differences between the base year and first follow-up response categories made it difficult to develop a comparable category scheme that would be sensitive to change and not measurement error. Because the lower response options employed in both the base year and first follow-up, if collapsed in the most sensible manner (base year options 1 & 2 would be collapsed to form the first follow-up equivalent option 1) would obscure some change (i.e., studying 1 hour in the base year and no hours in the first follow-up), the two sets of homework items were not recoded into a single comparable category

structure. Instead, the original base year homework items were crossed by the original first follow-up homework items and a code was written defining "more" or "less" studying as any combination of base year by first follow-up responses that unambiguously showed a change in studying time of at least 1 hour in either direction. Ambiguous situations, such as studying "no hours" in the base year and "1 hour or less" in the first follow-up or "2 hours" in the base year and "2-3 hours" in the first follow-up were coded as "no change."

Figure B.1
Base Year Homework Items and First Follow-Up Homework Items

Base Year **BYS79A-BYS79D**

In the following subjects, about how much time do you spend on homework EACH WEEK?

HOURS PER WEEK: (MARK ONE EACH)

mathematics homework (science, English, social studies)

NONE 0
LESS THAN 1 HOUR 1
1 HOUR 2
2 HOURS 3
3 HOURS 4
4-6 HOURS 5
7-9 HOURS 6
10 OR MORE HOURS 7
RESERVE CODES:
MULTIPLE RESPONSE 96
MISSING 98

First Follow-Up **F1S36B1-F1S36E1**

Overall and in the following subjects, about how much time do you spend on homework EACH WEEK, both in and out of school? (MARK ONE)

Time spent on mathematics (science, English, history) homework in school (out of school)

NONE 0
1 HOUR OR LESS 1
2-3 HOURS 2
4-6 HOURS 3
7-9 HOURS 4
10-12 HOURS 5
13-15 HOURS 6
OVER 15 HOURS 7
NOT TAKING MATH (science, English, History) 8
RESERVE CODES:
MULTIPLE RESPONSE 96
MISSING 98

The second noncomparability issue concerned measuring "time spent studying" separately for "in school" and "out-of-school" in the first follow-up but not in the base year. In this report, only students' first follow-up reports on the time they spent studying out-of-school were used in the change analysis. Because the typical eighth grade day does not include study periods or study halls as one finds in the typical high school day, in the base year, students most likely interpreted the homework items to mean time spent on homework outside of school or, more likely, at home. Thus, we reasoned comparability would be best achieved through employment of only the first follow-up "out-of-school" homework items.

Similar to the construction of other change scores, missing cases were eliminated on an item-by-item basis prior to constructing change scores. Students reporting "not taking this subject" on the first follow-up homework items were treated as missing cases.

The following constructed variables were taken directly from the base year and first follow-up student data files. Further detail about the derivation of these variables is presented in the *First Follow-Up Student Component Data File User's Manual*.

Sex. **F1SEX** was taken from the base year composite[6] variable. The composite was taken first from BYS12 in the base year student questionnaire. If this source was missing or not available, then the value of the variable SEX assigned on the school roster was used. If SEX was still missing, it was imputed from the respondent's name. For any students for which this could not be done unambiguously, a value of 1 (male) or 2 (female) was randomly assigned to the student.

Race/Ethnicity. The initial source of information for the composite **F1RACE** was the base year student questionnaire. If student information was missing, data from the parent questionnaire were used, or from sampling rosters if parent data were unavailable as well. The race categories are Asian (including Pacific Islanders); Hispanic, regardless of race; Black, not of Hispanic origin; White, not of Hispanic origin; and American Indian or Alaskan Native.

Socioeconomic Status (SES). **F1SES** was constructed using the base year parent questionnaire data when available. The following parent data were used: father's education level, mother's education level, father's occupation, mother's occupation, and family income (data coming from BYP30, BYP31, FYP34B, BYP37B and BYP80). Education-level data were recoded according to the definition of BYPARED described below. Occupation data were recoded using the Duncan SEI scale as used in HS&B and NLS-72. Parent data were used to construct F1SES if at least one component was not missing.

If all parent data components were missing, the following base year student questionnaire items were used to calculate F1SES for base year respondents: father's education level (BYS34A), mother's educational level (BYS34B), father's occupation (BYS7B), mother's occupation (BYS4B), and presence of household items (BYS35A-P).

Each nonmissing component (after any necessary recoding) was standardized to a mean of 0 and a standard deviation of 1. Nonmissing standardized components were averaged yielding the F1SES composite.

[6] A composite is a variable constructed from multiple sources of information, such as parent and student data. Typically, when constructing a composite one source, for example, parent data, is the initial, preferred source of information, and then, a second and sometimes a third source is used to fill in information which is missing from the first (or second) choice source.

Base Year Socioeconomic Status Quartile. **F1SESQ** is the quartile into which F1SES falls. It was constructed by recoding F1SES into quartiles based on the weighted, F1QWT, marginal distribution, for all 1990 completed cases: sophomores, dropouts, and students who were not in modal sequence, that is, 1988 eighth graders who were in grades other than grade 10 in spring 1990. The values for F1SESQ are:

1 = Quartile 1 Low
2 = Quartile 2
3 = Quartile 3
4 = Quartile 4 High
8 = Missing

Base Year Test Quartile. **BYTXQURT** was constructed by recoding BYTXCOMP (students' base year standardized test composite for reading and mathematics) into quartiles based on the weighted, BYQWT, marginal distribution.

School Control. Two different school classification schemes are used in the NELS:88 data. The scheme used in this report classified schools by their control into public, Catholic, independent (defined as members of the National Association of Independent Schools), and all other private schools. The base year school control composite (G8CTRL) classifies the type of school longitudinal cohort members attended in the spring of 1988; the first follow-up school control composite (G10CTRL2) classifies the type of school members attended in the first follow-up as of the spring of 1990.

School Enrollment (dropout or student). Because the eighth grade longitudinal panel, by definition, is composed of eighth grade cohort members who completed a questionnaire in both the base year and first follow-up surveys, the simplest means of classifying longitudinal cohort members as dropouts or students is by way of the first follow-up student questionnaire flag **F1QFLG**. In this report, this is how students and dropouts were identified within the eighth grade longitudinal cohort.

Equally important is an understanding of how dropouts are defined (as opposed to identified) in the first follow-up. Dropouts may be differently defined for different purposes. The particular definition that is chosen matters importantly both to estimation of dropout rates, and to causal modeling of dropout phenomena. NELS:88 defines dropping out in a standardized way while simultaneously embodying distinctions that permit flexibility in classifying kinds of dropouts and in generating estimates that may be compared to other data sources. In the NELS:88 first follow-up, the following dropout definition was employed:

1. a dropout is an individual who, according to the school (if the sample member could not be located), or according to the school and home, is not attending school (that is, has not been in school for four consecutive weeks or more and is not absent due to accident or illness)

2. a student who has been in school less than two weeks after a period in which he or she was classified as a dropout should be administered the dropout (rather than the student) questionnaire; all other in-school stopouts should be administered the student questionnaire

As in HS&B, dropout status was double-confirmed, since schools oftentimes mistakenly classify transfer students as dropouts; households can readily supply information about transfer status, which in turn can be confirmed by the destination school. Less often, dropouts are incorrectly labeled as transfers. Since

the NELS:88 methodology requires transfers too to be followed, absence at the supposed destination school triggers further inquiry into the sample member's whereabouts and enrollment status.

No dropout rate comparisons can be made between NELS:88 first follow-up and HS&B dropout results because of the different starting points of the studies. Individuals who dropped out during or prior to tenth grade were not in the HS&B sampling frame. Individuals who dropped out in the course of tenth grade were declared ineligible for the study. HS&B measured, in the spring of 1982, the enrollment status of those individuals only who completed the spring term of the sophomore year in the spring of 1980.

Even though the HS&B dropout rate and the NELS:88 first follow-up dropout rate cannot be directly compared, it nevertheless is instructive to consider definitional differences and similarities between the first follow-ups of NELS:88 and HS&B. Generally speaking, the NELS:88 first follow-up adhered to the dropout definitions, and methodologies for ascertaining dropout status, that were employed in HS&B, including the HS&B method that required (when possible) double confirmation (school and home) of dropout status.

However, the NELS:88 first follow-up, as noted above, did define in-school status liberally--more liberally than had HS&B, which regarded students not in regular high school diploma programs (e.g., GED students, or students receiving any other academic instruction that did not lead to a high school diploma) as a special kind of dropout, to be contrasted to dropouts who were receiving no academic instruction. Many alternative program designations were encountered in the course of the NELS:88 first follow-up. A student might be receiving vocational or GED instruction in a Job Corps Center, attending a school within a school for high-risk students, enrolled in a dropout re-entry program, attending a night school class for GED, attending a continuation school, receiving academic instruction at home from parents, enrolled in a non-diploma course such as travel agent training, attending an adult education school that holds a special class for high school dropouts, enrolled in an independent study school, receiving instruction by correspondence or at a learning center while serving in a juvenile detention facility, receiving instruction while enrolled in a drug rehabilitation clinic--all of these diverse educational situations were regarded as being "in school" for purposes of dropout classification in the NELS:88 first follow-up. A less liberal definition of school enrollment would of course have resulted in a higher recorded dropout rate. (In the NELS:88 second follow-up, data were collected to distinguish regular students and alternative completers, and so, second follow-up dropout data can be made comparable to both HS&B and NELS:88 first follow-up, despite their difference in approach to this issue. For details, see Ingels and Dowd, 1995.)

In one central respect, NELS:88 substantially improves on the stopout data gathered by HS&B. By checking enrollment status at three points in time over the two year interval between data collections, NELS:88 attempts to gather maximum information from school personnel and households about dropout events, including events that lead to a return to school prior to the next survey session. HS&B relied on a questionnaire item to identify past dropout events (specifically, item 17 on the 1982 sophomore cohort questionnaire, which asked for the longest period the individual had ever stayed away from school, and offered options ranging from less than one week to an entire quarter or semester, or a school year or longer). Relying on student self-report is a weaker approach to stopout identification than that taken in the NELS:88 first follow-up. Nonetheless, dropout spells of brief duration may be missed by the NELS:88 methodology. For example, a student who was at an eighth grade survey day in February of 1988 may have been a dropout between March and June of 1988. If that student has returned to school in the autumn of 1988, the tracing phase would identify that student as in school, with a resultant underreporting of dropout/stopout events. Neither NELS:88 students nor their schools or families were asked whether the

student dropped out before the end of eighth grade. (There may still then be a need to gather questionnaire data on potential stopout episodes--in the NELS:88 second follow-up, the parent questionnaire contained an item designed to do so.)

Year of Birth. F1BIRTHY was taken directly from Q. 11 of the base year student questionnaire for base year respondents. For base year non-respondents, values were taken from Q.3 of the first follow-up new student supplement. The expected range of F1BIRTHY is 70-80 with 98 indicating missing. Any outliers were collapsed into categories of: "Before 1970" and "After 1980". The birth year variable used in this report is the public-use version of the variable; for public-use, the variable was further altered to the present category structure for reasons of respondent confidentiality.

BY Family Composition. BYFCOMP is students' family composition as of the spring of 1988. It was constructed from students' base year responses to BYS8A-I.

Parent Education. F1PARED characterizes the highest level of education attained by either of the parents or guardians of the student. It was constructed using the parent questionnaire data (BYP30 and BYP31). Base year student data (BYS34A & BYS34B) were used for base year respondents whenever parent data were either missing or not available.

General Description of the NELS:88 Cognitive Test Scores

There are two broad types of scores available on the NELS:88 data files. One type is a **normative** score and the second type is a **criterion-referenced proficiency** (or "mastery") score. The **normative** scores can be divided into two subclasses, longitudinal, and cross-sectional. There are also two types of **criterion-referenced** scores--dichotomous proficiency scores, and probability of proficiency scores.

Normative Scores. There are two types of normative scores in the NELS:88 data set. One type is longitudinally-equated--the IRT-estimated number right score. The second type of normative score--the ability quartile--is standardized within a survey wave, that is, cross-sectionally.

The longitudinally-equated score that is available for both time points and all four achievement areas is the IRT-estimated number right score. The IRT-estimated number right for any individual at either of the two time periods reflects an estimate of the number of items that a person would have answered correctly if he or she had taken all of the items that appeared in any form of the test. The IRT model allows one to put all the scores in, say mathematics, on the same vertical scale so that the scores, regardless of grade, can be interpreted in the same way. All the normal statistical operations that apply to any cognitive test score can be legitimately applied to the IRT-estimated number right.

Quartile scores are cross-sectional in that they are standardized within each of the weighted NELS:88 sample waves. Since the ability quartiles are standardized within each wave, they are not vertically equated as are the IRT-estimated number right scores. These cross-sectional scores are primarily used in descriptive tables that compare data within a particular grade.

Criterion-Referenced Proficiency Scores. The two kinds of criterion-referenced mastery scores are based on clusters of items having similar content and difficulty. The first kind is a dichotomous score of "0" or "1" where a "1" indicates mastery of the material at this objective level and a "0" implies non-

mastery. The second kind is a continuous score indicating the probability that a student has mastered the type of items that describe a particular criterion-referenced level.

The 0-1 dichotomous proficiency scores were available only in mathematics and reading at the time that this report was prepared. The proficiency levels are hierarchically ordered in the sense that mastery of the highest level among three levels, for example, implies that one would have also mastered the lower two levels.

The second kind of proficiency score is the probability of being proficient at each of the levels. This is a continuous analogue to the dichotomous proficiency scores. The advantage of the probability score over the dichotomous proficiency score is that the probability score, being continuous, is statistically more powerful. In addition, it poses less of a missing data problem in that probabilities of being proficient at each level are available for any individual who had a test score in grade ten. The proficiency probabilities are particularly appropriate for relating specific processes to changes that occur at different points along the score scale.

Alternatively elaborated or more detailed construct interpretations than are represented by the NELS:88 proficiency levels may be derivable from the NELS:88 data. For an alternative approach to deriving multidimensional achievement scores from NELS:88 data that relates psychologically meaningful subscores to differentially related NELS:88 student, teacher and school variables, see Kupermintz et al. 1994 (Kupermintz, H.; Ennis, M.M.; Hamilton, L.S., Talbert, J.E., & Snow, R.E. *Enhancing the Validity and Usefulness of Large-Scale Educational Assessments: NELS:88 Mathematics Achievement.* Center for Research on the Context of Secondary Teaching, Stanford University).

Simple Gain and Gain in Probability of Proficiency Scores (Quality of Gain)

The NELS:88 first follow-up cognitive test battery consisted of multiple choice tests in four subject areas:

- Reading Comprehension (21 questions, 21 minutes)--This subtest contained five short reading passages, with three to six questions about the content of each. Questions encompassed understanding the meaning of words in context, identifying figures of speech, interpreting the author's perspective, and evaluating the passage as a whole.

- Mathematics (40 questions, 30 minutes)--Test items included word problems, graphs, equations, quantitative comparisons, and geometric figures. Some questions could be answered by simple application of skills or knowledge; others required the student to demonstrate a more advanced level of comprehension or problem solving.

- Science (25 questions, 20 minutes)--The science test contained questions drawn from the fields of life science, earth science, and physical science/chemistry. Emphasis was placed on understanding of underlying concepts rather than retention of isolated facts.

- History/Citizenship/Geography (30 questions, 14 minutes)--American history questions addressed important issues and events in political and economic history from colonial times through the recent past. Citizenship items included questions on the workings of the federal government and the rights and obligations of citizens. The geography questions touched on patterns of settlement and food production shared by other societies as well as our own.

Table B.1: Test Means, Standard Deviations, Reliabilities, and SEs

	MEAN	S.D.	ALPHA	S.E.
Reading--Low Form	11.6	4.4	.80	2.0
Reading--High Form	14.1	4.1	.78	1.9
Mathematics--Low Form	17.4	6.1	.79	2.8
Mathematics--Mid Form	23.3	7.5	.86	2.8
Mathematics--High Form	32.3	5.0	.81	2.2
Science	13.7	5.2	.83	2.2
Social Studies	18.9	6.0	.85	2.3

Score means, standard deviations, reliabilities (coefficient alpha), and standard errors of measurement for each NELS:88 first follow-up subtest are shown in Table B.1. The standardized cognitive test scores reported in the NELS:88 database are transformations of the IRT-Estimated Number Right scores, rescaled to a mean of 50 and standard deviation of 10 (using the first follow-up questionnaire weight).

The four NELS:88 achievement tests were designed to reflect the high school curriculum. Central emphasis was placed on general concepts and the development of problem-solving abilities, rather than on highly specific curriculum content--given the heterogeneity of the high school curriculum, the two year interval between testing, and the problem, for gain measurement, of "forgetting" if tests emphasize curriculum-related knowledge that is highly specific. To make them more adaptive and increase the precision of measurement, two of the tests--reading and mathematics--had multiple forms or levels; assignment to a high or low form of the 1990 test was based on performance on the 1988 test. Table B.2 gives curriculum content and mastery or process specifications for the cognitive test battery across all three waves (1988, 1990, and 1992). For further details on construction of the base year and first follow-up cognitive test battery, and the psychometric properties of the tests, see chapter 6 of the *NELS:88 First Follow-Up Final Technical Report.*

Table B.2: NELS:88 Reading specifications content by process by test forms (number of items included in the reading tests in each of the content areas)

Process	Literary	Science	Social Studies/Other
Reproduction of Detail			
8th Grade	3	1	-
10th Grade Low	3	1	-
10th Grade High	2	1	1
12th Grade Low	3	1	1
12th Grade High	-	-	1
Comprehension of Thought			
8th Grade	1	1	1
10th Grade Low	1	1	1
10th Grade High	3	1	2
12th Grade Low	-	2	4
12th Grade High	-	1	8
Inferences and/or Evaluative Judgements			
8th Grade	10	1	3
10th Grade Low	10	1	3
10th Grade High	9	1	1
12th Grade Low	6	1	3
12th Grade High	4	3	3

Table B.2: NELS:88 Math specifications content by process by test forms (cont'd) (number of items included in the mathematics tests in each content areas)

Process	Arithmetic	Algebra	Geometry	Data/Prob	Adv Topic
Skill/Knowledge					
8th Grade	10	5	1	1	-
10th Grade Low	12	4	2	-	-
10th Grade Med	9	3	-	1	1
10th Grade High	6	3	-	2	2
12th Grade Low	10	4	2	-	-
12th Grade Med	7	2	-	1	1
12th Grade High	1	2	-	1	2
Under/Comprehen					
8th Grade	6	7	3	3	-
10th Grade Low	7	6	3	2	-
10th Grade Med	6	6	3	2	-
10th Grade High	3	7	2	3	2
12th Grade Low	6	5	3	3	-
12th Grade Med	4	6	4	2	-
12th Grade High	1	5	7	1	3
Problem Solving					
8th Grade	3	-	-	-	1
10th Grade Low	3	-	-	-	1
10th Grade Med	3	2	2	-	2
10th Grade High	2	2	3	-	2
12th Grade Low	4	-	2	-	1
12th Grade Med	4	3	5	-	1
12th Grade High	2	4	9	1	1

Table B.2: NELS:88 Science specifications content by process by test forms (cont'd) (number of items include in the science tests in each of the content areas)

Process	Earth Sci	Chem	Sci Meth	Life Sci	Phy Sci
Skill/Knowledge					
8th Grade	5	2	-	3	-
10th Grade	3	2	-	2	1
12th Grade	3	3	-	3	1
Under/Comprehen					
8th Grade	2	2	1	2	-
10th Grade	2	1	1	2	1
12th Grade	1	-	3	1	-
Problem Solving					
8th Grade	1	3	2	2	-
10th Grade	-	3	1	3	2
12th Grade	-	3	1	2	4

NELS:88 Social studies specifications content by test forms (number of items included in the social science tests in each of the content areas)

	Cit/Govt	Am Hist	Geog
8th Grade	13	14	3
10th Grade	8	19	3
12th Grade	12	15	3

Test variables used in this report were taken from the initial release of the first follow-up student data files. The first follow-up student data file includes six classes of test variables: IRT-estimated number right scores in math, science, English, and history; standardized scores for all subject areas and an overall standardized composite constructed from students' math and English standardized scores; IRT-estimated gain from the base year to first follow-up for all subject areas (simple gain); proficiency scores at each skill level and overall in reading and math; and gain in probability of proficiency at each skill level in math and reading and overall. Science proficiency scores for 1988-1992 are available on the second follow-up student data files.

Specific test variables employed in this report were as follows:

Simple Gain Scores

- Reading IRT-Estimated Gain BY-F1--**F1TXRG**
- Mathematics IRT-Estimated Gain BY-F1--**F1TXMG**
- Hist/Cit/Geog IRT-Estimated Gain BY-F1--**F1TXHG**
- Science IRT-Estimated Gain BY-F1--**F1TXSG**

Gains in Probability of Proficiency (Quality of Gain)

- Mathematics Level 1 Gain in Probability--**F1TXMGP1**
- Mathematics Level 2 Gain in Probability--**F1TXMGP2**
- Mathematics Level 3 Gain in Probability--**F1TXMGP3**
- Mathematics Level 4 Gain in Probability--**F1TXMGP4**
- Reading Level 1 Gain in Probability--**F1TXRGP1**
- Reading Level 2 Gain in Probability--**F1TXRGP2**

Gain Scores. Simple gain scores are the simple differences between a student's tenth grade mathematics score, for example, and his/her eighth grade score. The base year and first follow-up test scores are not directly comparable with each other because the same test forms were not used at both points in time. However, the base year and first follow-up tests shared enough overlapping items that IRT scoring could be employed to put the scores on the same scale. The gain scores reported are the difference between the first follow-up IRT-Estimated Number Right scores on the total item pool, and estimates of the scores that would have been obtained on the same set of items, using the rescaled base year ability estimates.

Although these scores are described as "gain" scores, not all of them represent an improvement in measured skills. Some of the gain scores are negative. Factors that contribute to negative gain scores include students' forgetting material that they once knew but have not practiced, and measurement error produced primarily by some students' lack of motivation in responding to the test questions.

Note that the scores reported here do not share a common metric with those on the base year file. That is, the base year eighth grade scores have been re-scaled for purposes of gain computation. (To derive the "new" eighth grade scores, subtract the first follow-up IRT estimated gain score from the 1990 IRT estimated number right score.) It would be incorrect for the user to compute gain by comparing the IRT scores included in the two different files.

Proficiency Scores and Gain in Probability of Proficiency. The NELS:88 combined base year-first follow-up data release provide proficiency scores in two areas, mathematics and reading. Subsequent to the analyses conducted in this report, proficiency scores at eighth and tenth grade levels were produced for science, and are included in the NELS:88 second follow-up release. The proficiency scores provide a means of distinguishing total score gain, as measured by overall IRT-Estimated Number Right scores and standardized scores, from gain in specific skills. At several points along the score scale of the reading, science and mathematics tests, four-item clusters of test questions having similar content and difficulty were identified. A student was assumed to have mastered a particular level of proficiency if at least three of the four items in the cluster were answered correctly and to have failed at this level if two or more items were wrong. Clusters of items provide a more reliable test of proficiency than do single items because of the possibility of guessing in a multiple choice test: it is very unlikely that a student who has not mastered a particular skill would be able to guess enough answers correctly in a four-item cluster. (For some of the students who had omitted critical items, a complex IRT-based procedure, which is described elsewhere, was undertaken to resolve proficiency score assignments.) The proficiency levels were assumed to follow a Guttman model; that is, a student passing a particular skill level was expected to have mastered all lower levels; a failure should have indicated nonmastery at higher levels. A small percentage of students had response patterns that did not follow the Guttman model, with a failing score at a lower level followed by a pass on a more difficult item cluster. Students with these "reversal" patterns were not assigned proficiency scores.

Again, science proficiency scores were not available for use in this report. Four levels were marked in the mathematics test and two levels were marked in the reading test, defined as follows.

- Math Level 1 - simple arithmetical operations on whole numbers
- Math Level 2 - simple operations with decimals, fractions, and roots
- Math Level 3 - simple problem solving, requiring conceptual understanding or the development of a solution strategy
- Math Level 4 - conceptual understanding and complex problem solving
- Reading Level 1 - simple reading comprehension, including reproduction of detail and/or the author's main thought
- Reading Level 2 - ability to make references beyond the author's main thought and/or understand and evaluate relatively abstract concepts

Gain in the probability of proficiency scores were also constructed as a continuous analogue to the four dichotomous proficiency levels. Gains in probability of proficiency were constructed using IRT methods to estimate students' gain in probabilities of mastery at each skill level, treating clusters of items as single items for the purpose of IRT calibration. As is explained further in the following section on change measurement, these measures of gain in probability of mastery at each level of proficiency allow researchers to relate students' school experiences to improvements in specific skills as well as to overall gain on the test as a whole. Note that because these scores are IRT-based, *gains at math Level 4 can be measured, even though there was no Level 4 on the base year math test.* (For further information on the various NELS:88 cognitive test variables that can be employed in measuring cognitive gains, see Ingels et al., 1992, Appendix I pp. 17-23, *First Follow-Up Student Component Data Files User's Manual.)*

Three Ways of Measuring Change

This report illustrates two ways that change can be measured using NELS:88 test scores. The first way is through the use of simple gain scores such as the difference between a student's tenth grade score and eighth grade score (using IRT-estimated number right scores; IRT theta scores could also be used in this manner, and appear with the second follow-up data release).[7] The second device illustrated in this report for measuring change is use of the probability of proficiency scores. A third way that change can be gauged is through use of the dichotomous proficiency scores (for an example of this technique, see Rock, Owings, and Lee, 1994). It may be useful to contrast the use of simple gain scores and probability proficiencies, and to elaborate further on the use of the probability of proficiency scores in change analysis.

The probability of being proficient at a given level is a continuous score provided in the NELS:88 data for mathematics and reading, and in the second follow-up for science. This is a continuous analogue to the dichotomous proficiency scores. These scores are particularly useful for relating specific processes to changes that occur at different points along the growth curve. Since the proficiency levels are hierarchical they mark different ascending points along the growth curve or score scale. If, for example, one wished to evaluate the impact of taking advanced math courses on changes in mathematics from grade 8 to grade 10, one might use one of the following approaches. One approach to doing this would be to subtract every student's 8th grade IRT-estimated number right from the their 10th grade IRT-estimated number right and correlate this difference with the number of advanced mathematics courses taken between the 8th and 10th grade. The result is likely to be a relatively small positive correlation. It will be relatively small because individuals taking no advanced mathematics courses are also gaining but probably at the low end of the test score scale. Individuals who are taking advanced mathematics courses are also gaining but at the higher end of the test score scale. To be more concrete, let us say that the individuals who took none of the advanced math courses gained on average 3 points, all at the low end of the test score scale. Conversely, the individuals who took the advanced math courses gained 4.5 points but virtually all these individuals made their gains at the upper end of the test score scale. When the researcher correlates change with gains the fact that on average the advanced math takers gained only slightly more than those taking no advanced mathematics courses will lead to a very small correlation between gain and process (advanced math course taking). This low correlation has nothing to do with reliability of gain scores, but it has much to do with **where** on the test score scale the gains are taking place. Gains in the upper end of the test score distribution reflect increases in knowledge in advanced mathematical concepts and processes while gains at the lower end reflect gains in basic arithmetical concepts. In order to relate specific processes to gains successfully one has to match the process of interest to where on the growth curve the gain is taking place.

Proficiency probabilities do this since they mark ascending places on the test score distribution. If one wishes to relate the number of advanced math courses taken to changes, one should look at changes at the upper end of the test score distribution. How does one use the proficiency probabilities to do this?

There are four proficiency levels in mathematics with level 4 marking the highest point along the test score scale. Every tested individual has a continuous measure of change in terms of a difference in probabilities. One would expect advanced math enrollment to have its greatest effects on changes in probabilities of being proficient at the highest levels. Thus, one would simply subtract each individual's

[7] For additional illustrations of the use of NELS:88 number-right scores in change analysis, see Rasinski, 1994 and Hoffer, Rasinski & Moore, 1995 (details of these publications may be found in Appendix D).

8th grade probability of being proficient at say level 4 from the corresponding probability of being proficient at level 4 in 10th grade. One then correlates this change in level 4 probabilities with the number of advanced mathematics courses taken and the researcher will observe a substantial increase in the relationship between change (achievement gain) and process (number of advanced mathematics courses taken). The main point here is that certain school processes, in particular, course taking patterns, target gains at different points along the test score distribution. One has to match the type of school process one is evaluating with the location on the test score scale where the gains are likely to be taking place and then select the proper proficiency levels for appropriately evaluating that impact.

The dichotomous proficiency scores--where a "1" indicates mastery of the material at the given level and a "0" implies lack of mastery--can also be used to measure achievement gain. These scores can be used to examine patterns of change with respect to proficiency level. As noted above, Rock, Owings and Lee (1994) illustrates their use in this fashion, by examining percentage changes in the proportion of students classified as being at a given mathematics mastery level between 1988 and 1990.

On one point the findings of Rock, Owings and Lee (1994) differ somewhat from findings of this report. The specific point of apparent difference is found in their conclusions regarding gender differences in 1988-1990 gains in math proficiency. Rock, Owings and Lee (1994) report a small but statistically significant male advantage in growth of mathematics mastery (in general, Rock, Owings and Lee (1994) report, males made more gains than did females, though for students in the normal mathematics progression, greater male gains can be found only for those individuals who were classified as being proficient at simple problem-solving in eighth grade.) The somewhat different findings reported here--namely, that there were no differences between the two gender groups in terms of either raw gain (measured in mean scores) or patterns of gain across the proficiency levels--is best explained by the fact of differences in the numbers of cases available for analysis when one employs dichotomous proficiency scores for mathematics change measurement (the scores used in Rock, Owings, and Lee, 1994) as contrasted to the continuous change in probability of proficiency scores or the IRT number right scores (the two measures used in this report).

The IRT-estimated probabilities of being proficient at each of the levels are available for any individual who had a test score. In contrast, there is more missing data in the dichotomous scores (among other reasons, because scores of some students violate the hierarchical assumptions of the Guttman model). In Rock, Owings, and Lee (1994), the sample *N* for whom the relevant variables (BYTXMPRO and F1TXMPRO) were available was 12,532. For the gain analyses in this report, employing change in proficiency probability, or simple gain scores, the sample *N* was 15,315. The very slight differences in findings probably reflect the differences in samples available for analysis.

IRT Re-Scaling of NELS:88 Base Year and First Follow-Up Test Scores in the Second Follow-Up. IRT models the probability of answering an item correctly as a mathematical function of proficiency or skill, thus permitting use of a common scale on which performance can be compared across groups (including those who took easier or harder versions of the NELS:88 tests) and time (NELS:88 results must be put on the same vertical [that is, eighth to tenth to twelfth grade] scale). A third data point (1992) for the NELS:88 test battery permits refinement of the IRT-derived item parameters and ability estimates of first follow-up (and base year) test results. That is to say, because NELS:88 is a longitudinal study in which many items are common across all three administrations, additional vertical scaling data become available with each successive round, permitting pooled re-estimation of item parameters and ability distributions, with the result that earlier parameter estimates can be improved. The use of all data points over time is the method best suited to providing stable estimates of both the item traces and latent trait

scores throughout the entire ability distribution. Second follow-up IRT scores were computed using a Bayesian scaling program (PARSCALE) that took prior-round ability estimates into account.[8] First follow-up test results were rescaled after analyses presented in this report were conducted and are available on the second follow-up re-release of the first follow-up student file.

Although rescored first follow-up test data differ little from data used in this report, such rescaling helps to "shrink" any ceiling (or floor) effects so that cognitive growth in the four tested subjects can more accurately be measured for the highest-performing (or lowest-performing) students. The resulting changes in test scores, however, are too small to alter any conclusions reached in this report. The following Pearson correlation coefficients for originally released and second follow-up rescaled 1990 test results for IRT-estimated number right scores are as follows: mathematics, .992; science, .997; reading, .992; and social studies, .991. For the base year data, the Pearson correlation coefficients between old and new IRT-estimated number right scores are as follows: mathematics, .991; science, .991; reading, .990; and social studies, .988.

Other Variables

In addition to the constructed variables enumerated above, some row and column variables that appear in the tables in this report were taken directly, without alteration, from the base year student data file and first follow-up student and dropout data files. These variables are presented below as a content stem accompanied by their variable label from the base year or first follow-up data files. For example, the first follow-up student question on the difficulty of the first year of high school relative to the year before is question 65 with subparts, A through E. It bears the variable name "F1S65A, "F1S65B", "F1S65C", "F1S65D" and "F1S65E"--F1 standing for the first follow-up, S for the student questionnaire, and 65A, for example, for the specific data element--part A of question 65 on the student questionnaire. The same notation system was used for base year variables and first follow-up dropout and new student supplement variables: BYS stands for base year student questionnaire, F1D stands for first follow-up dropout questionnaire, and F1N indicates first follow-up new student supplement. The first follow-up new student supplement was administered to base year nonrespondents who were participating for the first time in the first follow-up. The number and, sometimes, letter, that follows indicates the actual questionnaire item number and subpart, if the latter is applicable.

Repeated a grade--**F1N22**

Have or expecting a child--**F1S76**

Reasons for leaving school--**F1D6A-F1D6U**

Student report of the "difficulty" of first year of high school relative to the year before--**F1S65A-F1S65E**

[8] Pooling all three time points, which amounts to pooling all items as well as people and recomputing all the item parameters using Bayesian priors reflecting the ability distributions associated with each particular test form, provides for an empirically based shrinkage to more reasonable item parameters and ability scores. The fact that the total item pool is used in conjunction with Bayesian priors leads to a shrinking back of the extreme item parameters as well as the perfect scores to a more reasonable quantity, which in turn allows for the potential of some gains even in the uppermost tail of the distribution. This approach--using adaptive testing procedures combined with Bayesian procedures that allow for priors on both ability distributions and on the item parameters--is an effective means for minimizing ceiling and floor effects in longitudinal assessments.

Family and life event items--**F1S99A-F1S99S**

Behavioral school crime ("safety") items--The base year-first follow-up comparison table, Table 3.4, reports on three behavioral measures of school crime taken directly from the base year student questionnaire and first follow-up student questionnaire unaltered. **BYS57A** and **F1S9A** are the base year and first follow-up, respectively, variables for "Had something stolen at school." **BYS57B** and **F1S9B** are the base year and first follow-up variables for "Someone offered to sell me drugs." **BYS57C** and **F1S9C** are the base year and first follow-up variables for "Someone threatened to hurt me."

School climate items--Similarly, the base year and first follow-up comparison table on school climate, Table 3.8, reports on seven of 13 school climate items appearing in the base year student questionnaire and repeated in the first follow-up student questionnaire. The analysis employed only climate items that unambiguously conveyed a favorable school climate when respondents answered "agree" or "strongly agree." That is, only positively worded items (as opposed to negatively worded items, e.g., misbehaving students often get away with it) were used. The seven climate items and corresponding variable names are listed below:

Students get along well with teachers--**BYS59A, F1S7A**
There is real school spirit--**BYS59B, F1S7B**
Discipline is fair--**BYS59D, F1S7D**
Teaching is good--**BYS59F, F1S7G**
Teachers are interested in students--**BYS59G, F1S7H**
When I work hard on my schoolwork, my teachers praise my effort--**BYS59H, F1S7I**
Most of my teachers listen to what I have to say--**BYS59J, F1S7L**

B.5 Additional Information

Additional information about the aims and design of the study, data collection results, and documentation of the data files is provided in various NELS:88 documentary reports. Specifically, detailed information on the sample design, universe coverage, sample selection procedures, weighting methodology, selected standard error estimates, estimates of design effects for broad categories of students, and results of nonresponse analyses is reported in the base year sample design report (Spencer, Frankel, Ingels, Rasinski & Tourangeau, 1990), first follow-up student data file user's manual (Ingels, Scott, Lindmark, Frankel & Myers, 1992), and the base year (Ingels, Rasinski, Spencer, Frankel & Buckley, 1990) and first follow-up (Ingels, Scott, Rock, Pollack and Rasinski, 1994) final technical reports. Documentation of the baseline (1988) tests may be found in the NELS:88 base year psychometric report (Rock and Pollack, 1990) while psychometric properties of the first follow-up tests are documented in Ingels, Scott, Rock, Pollack and Rasinski, 1994. A psychometric report will be produced under the second follow-up contract as well.

Appendix C: Overview of the NELS Program and the NELS:88 First Follow-Up (1990)

The NCES National Education Longitudinal Studies (NELS) Program

The longitudinal studies program of the U.S. Department of Education's National Center for Education Statistics (NCES) reflects the agency's commitment to collect and analyze data on the factors affecting the transitions of students from elementary school to high school and eventually to productive roles in American society. Consistent with its commitment--and in response to the need for policy-relevant, time-series data on nationally representative samples of elementary and secondary students--NCES instituted the National Education Longitudinal Studies (NELS) program, a continuing long-term project. The general aim of the NELS program is to study the educational, vocational, and personal development of students at various grade levels, and the personal, familial, social, institutional, and cultural factors that may affect that development. The NELS program currently consists of three major studies: the National Longitudinal Study of the High School Class of 1972 (NLS-72); High School and Beyond (HS&B); and the National Education Longitudinal Study of 1988 (NELS:88). Taken together, these studies represent the educational experience of youth from three decades-- the 1970s, 1980s, and 1990s. The research design for these three studies is depicted in Figure C.1, below.

NLS-72. The first of the NELS projects, the National Longitudinal Study of the High School Class of 1972 (NLS-72), began in the spring of 1972 with a survey of a national probability sample of 19,001 seniors from 1,061 public, secular private, and church-affiliated high schools. The sample was designed to be representative of the approximately three million high school seniors enrolled in more than 17,000 schools in the spring of 1972. Each sample member was asked to complete a student questionnaire and a 69-minute test battery. School administrators were also asked to supply survey data on each student, as well as information about the schools' programs, resources, and grading systems.

Five follow-ups, conducted in 1973, 1974, 1976, 1979, and 1986, have been completed. At the time of the first follow-up, an additional 4,450 students from the class of 1972 were added to the sample. Through intensive locating and tracking efforts, 13,912 of the 1972 base-year respondents and 4,016 participants in the expanded first follow-up sample responded to the fourth follow-up in 1979. The fifth follow-up included 12,841 participants from a subsample of 14,489 respondents who participated in the base year or one of the subsequent follow-ups.

In addition to background information, the NLS-72 base year and follow-up surveys collected data on respondents' educational activities, such as schools attended, grades received, and degree of satisfaction with their educational institutions. Participants were also asked about work experiences, periods of unemployment, job satisfaction, military service, marital status, and children. Attitudinal information on self-concept, goals, participation in political activities, and ratings of their high schools are other topics for which respondents have supplied information.

HS&B. High School and Beyond (HS&B) was designed to build on the NLS-72 in three ways. First, the introduction of a sophomore cohort provided data on the many critical educational and vocational choices made between the sophomore and senior years in high school, permitting a fuller understanding of the secondary school experience and its impact on students, as well as providing a basis for comparing dropouts and school persisters. Second, the base year survey of HS&B included a 1980 cohort of high school seniors that was directly comparable with the 1972 cohort. Replication of selected 1972 student questionnaire items and test items made it possible to analyze changes that occurred subsequent to 1972 and their relationship to recent Federal policies and programs in education. Finally, HS&B expanded the NLS-72 focus by collecting data on a range of lifecycle factors, such as family-formation behavior, intellectual development, and social participation.

The HS&B Base Year Survey. The base year survey was conducted in the spring term of 1980. The study design provided for a highly stratified national probability sample of 1,015 secondary schools as the first stage units of selection. In the second stage, 36 seniors and 36 sophomores were selected in each school (in schools with fewer than 36 students in either of these groups, all eligible students were included). Certain types of schools were oversampled to increase the usefulness of HS&B data for policy analysis. These included public schools with high percentages of Hispanic students, Catholic schools with high percentages of minority students, alternative public high schools, and private schools with high-achieving students.

The HS&B base year student questionnaires focused on individual and family background, high school experiences, work experiences, and plans for the future. The cognitive tests measured verbal and quantitative abilities, and included achievement measures in science, writing, and civics. School questionnaires provided information about enrollment, staff, educational programs, facilities and services, and special programs. A teacher comment checklist provided teacher observations on students, while the parent questionnaire (administered to a subsample of parents) elicited information about how family attitudes and financial planning affected postsecondary educational goals.

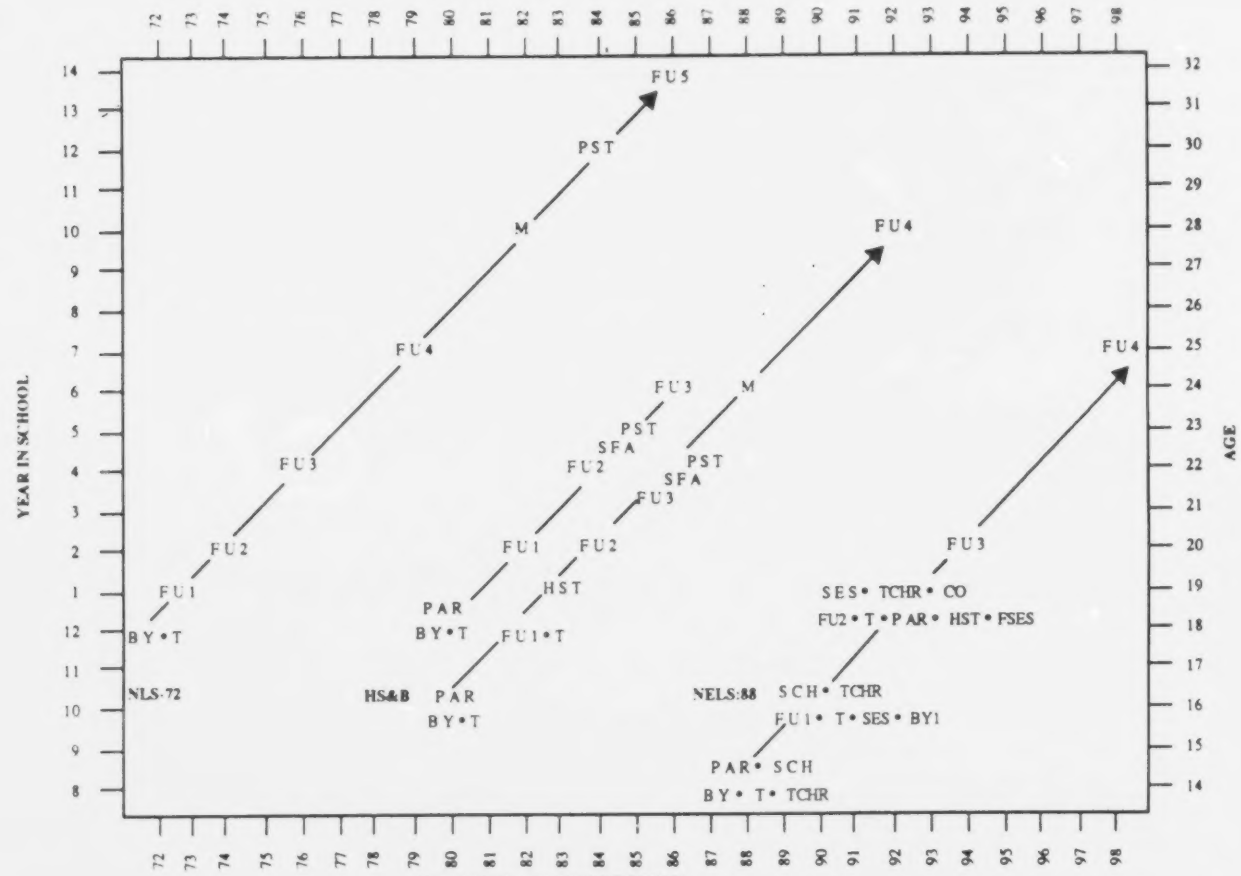
The HS&B Follow-Ups. A subsample of the 1980 HS&B senior cohort was followed out of school, and resurveyed in 1982, 1984, and 1986. The sophomore cohort was resurveyed in 1982, when most sample members were high school seniors, although a substantial proportion of the cohort was surveyed out of school, either as dropouts (14%)[1] or early graduates (5%). The sophomore cohort was again resurveyed in 1984, 1986, and in 1992. Postsecondary transcripts information was collected for both cohorts, with the most recent update of sophomore cohort postsecondary transcripts data taking place in the fall of 1992. High School transcripts, however, have been collected only for the sophomore cohort.[2]

In addition to the various follow-ups of the HS&B student sample, there have been two follow-ups of the HS&B school sample. **The Administrator and Teacher Survey (ATS)** was conducted in 1984 in a probability subsample of 479 participating HS&B schools. In order to describe the impact of the school environment on the educational process more precisely, ATS gathered information on school climate, process, and functioning from principals; heads of guidance; vocational and community service program coordinators; and up to thirty teachers in each school. **The National Longitudinal Study of Schools (NLSS)** is an OERI-sponsored follow-up of the HS&B school sample, which was designed to gather information that will describe how American high schools have changed since HS&B (1980-82) and since 1984 (ATS). (The sample was freshened to make it representative of American high schools in 1992). In 1992, data were collected from high school principals about the organization of their school

[1] While 13.6 percent of the sophomore cohort was surveyed as dropouts in 1982, some sample members surveyed as students dropped out after survey day or otherwise left school before graduating. Some "missed" dropouts, moreover, were identified through their high school transcripts or in follow-up rounds. An HS&B 1980-82 dropout rate of 17.3 percent can be derived based on third follow-up responses to the question whether the respondent graduated from high school with his or her class or earlier (however, sample members may have graduated behind their class without ever having had a dropout event that was in accordance with the HS&B dropout definition). (By the time of the HS&B third follow-up in 1986, almost half [46.5%] of the HS&B dropouts had completed high school or received a GED.)

[2] Additional high school transcripts data are available through the two high school transcripts studies conducted in NAEP schools of 1987 and 1990 seniors; further high school transcripts data will become available in the course of 1995 with release of the NELS:88 second follow-up academic transcripts data.

Figure C.1: Research Design for the NCES National Education Longitudinal Studies (NELS) Program



NLS-72 = National Longitudinal Study of the High School Class of 1972
BY = Base year data collection
FU1 = First follow-up data collection
FU2 = Second follow-up data collection
FU3 = Third follow-up data collection
FU4 = Fourth follow-up data collection
FU5 = Fifth follow-up data collection
M = Maintenance of address date
PST = Postsecondary education transcripts
T = Cognitive test administration

HS&B = High School & Beyond: 1980
BY = Base year data collection
FU1 = First follow-up data collection
FU2 = Second follow-up data collection
FU3 = Third follow-up data collection
FU4 = Fourth follow-up data collection
HST = High school transcripts
M = Maintenance of address date
PAR = Survey of parents
PST = Postsecondary education transcripts
SFA = Student financial aid records
T = Cognitive test administration

NELS:88 = National Education Longitudinal Study of 1988
BY = Base year data collection
BY1 = Base Year Ineligible Study
FSES = Followback Study of Excluded Students
FU1 = First follow-up data collection
FU2 = Second follow-up data collection
FU3 = Third follow-up data collection
FU4 = Fourth follow-up data collection
HST = High school transcripts
CO = Course offerings
PAR = Survey of parents
SCH = School administrator survey
SES = School effectiveness study
T = Cognitive test administration
TCHR = Survey of teachers

and key HS&B and ATS items were re-asked. In addition, detailed information about mathematics instruction and assessment was collected from a sample of mathematics teachers. State and local (or diocesan) education agencies were also surveyed, in order to determine the relationship between policy activity and specific changes in the organizational structure of high schools.

Overview of NELS:88

The *1988 base year* of NELS:88 represents the first stage of a major longitudinal effort designed to provide trend data about critical transitions experienced by students as they leave elementary school and progress through high school and into postsecondary institutions or the work force. The 1988 eighth-grade cohort is being followed at 2-year intervals in order to obtain policy-relevant data about educational processes and outcomes--particularly those pertaining to student learning, early and late predictors of dropping out, and school effects on students' access to programs and equal opportunity to learn.

The *first follow-up*, which took place in *1990*, provides the first opportunity for longitudinal measurement of the 1988 baseline sample. It also provides a comparison point to high school sophomores 10 years before, as studied in HS&B. The study captures the population of early dropouts (those who leave school prior to the end of tenth grade), while monitoring the transition of the student population into secondary schooling.

The *second follow-up* took place in *1992*, when most sample members were second-term seniors. The second follow-up provides a culminating measurement of learning in the course of secondary school and collects information that will facilitate investigation of the transition into the labor force and post-secondary education after high school. Because the NELS:88 longitudinal sample was freshened to represent the twelfth-grade class of 1992, trend comparisons can be made to the senior cohorts of 1972 and 1980 that were studied in NLS-72 and HS&B. The NELS:88 second follow-up resurveyed students who were identified as dropouts in 1990 and identified and surveyed those additional students who had left school since the prior wave.

The NELS:88 *third follow-up* took place in *1994*, when most sample members had left high school. The primary goals of the 1994 round are to provide for trend comparisons with NLS-72 and HS&B and to address issues of employment and postsecondary access and choice. Additionally, the third follow-up provides a basis for assessing how many dropouts have returned to school and by what route and for measuring the access of dropouts to vocational training programs and to other educational opportunities. A *fourth follow-up* is scheduled for *1998*, the year in which most members of the 1988 eighth grader cohort will turn 24.

Study Components. The longitudinal data gathered from students is augmented through parent, teacher, school administrator and archival[3] accounts of students' progression and development. The simultaneous gathering of student and contextual data will lead to a better understanding of various facets of students' lives--their problems and concerns; their relationships with parents, peers, teachers; and the

[3] Academic transcripts are recognized to be an objective and reliable measure of students' educational experience, superior in level of detail, accuracy and completeness to student self-reports of course-taking and grades. As in High School and Beyond (HS&B), transcripts have been collected for students' entire high school careers. In addition to course, credit and grade information, other school records data such as days absent, participation in special programs, class rank, GPA, and test scores (PSAT, SAT, ACT, AP) are included on the transcripts file. NELS:88 transcripts data were released on a privileged use basis in 1995.

characteristics of their schools--and permit investigation of the effect of these factors on social, behavioral, and educational development. (The basic study components, by round, are sketched in Figure C.2 below.)

Intercohort Comparisons: NELS:88, HS&B, NLS-72. While the primary objective of NELS:88 is to support longitudinal analyses, the study is also designed to support the generation of single estimates in time and time-series (repeated cross-sectional) intercohort comparisons. For purposes of cross-sectional analyses, nationally representative samples of 1990 sophomores and 1992 seniors are made possible by means of a procedure for sample freshening. In both the first and second follow-ups, tenth and twelfth grade students, respectively, who did not have an opportunity for selection into the study in the base year were added to ensure nationally representative cross-sectional cohorts. With the creation of a nationally representative tenth grade cross-sectional cohort, trend comparisons between High School and Beyond (HS&B) 1980 sophomores and 1990 NELS:88 first follow-up sophomores may be drawn. Similarly, cross-cohort comparisons between the NELS:88 senior class of 1992, HS&B seniors of 1980 (and, with some qualification, 1982) and the National Longitudinal Study of the High School Class of 1972 (NLS-72) senior cohort can be conducted, as well as comparisons between high school seniors using transcript data (HS&B 1982, NAEP 1987 and 1990, and NELS:88 1992, and NAEP 1994 and 1996).

NELS:88 Base Year. The base year survey was conducted in the spring term of the 1987-1988 school year. A clustered, stratified national probability sample of 1,052 public and private eighth grade schools participated. Almost 25,000 students across the United States participated in the base year study. The sample represents the Nation's eighth grade population, totalling over 3 million eighth graders in more than 38,000 schools in spring 1988. Questionnaires and cognitive tests were administered to each student in the NELS:88. The student questionnaire covered school experiences, activities, attitudes, plans, selected background characteristics, and language proficiency. The school principal completed a questionnaire about the school; two teachers of each student were asked to answer questions about the student, about themselves, and about their school; and one parent of each student was surveyed regarding family characteristics and student activities.

Figure C.2: Base Year Through Fourth Follow-Up -- NELS:88 Components

BASE YEAR	FIRST FOLLOW-UP	SECOND FOLLOW-UP	THIRD FOLLOW-UP
spring term 1988	spring term 1990	spring term 1992	spring 1994
GRADE 8	MODAL GRADE = SOPHOMORE	MODAL GRADE = SENIOR	H.S. + 2 YEARS
Students: Questionnaire, Tests*	**Dropouts, Students:** Questionnaire, Tests	**Dropouts, Students:** Questionnaire, Tests, H.S. Transcripts	**All Individuals:** Questionnaire
Parents: Questionnaire		**Parents:** Questionnaire	**FOURTH FOLLOW-UP**
Principals: Questionnaire	**Principals:** Questionnaire	**Principals:** Questionnaire	spring 1998
Two Teachers per student: (taken from English, social studies, mathematics, science)	**Two Teachers per student:** (taken from English, social studies, mathematics, or science)	**One Teacher per student:** (taken from mathematics or science)	HS + 6 YEARS **All Individuals:** Questionnaire

* Reading, social studies, math and science tests are administered in the three in-school rounds.

First Follow-up Design and Data Collection Results

The NELS:88 first follow-up questionnaires and cognitive tests were designed to meet four general requirements for information about American education. These can be characterized as **looking backward** within the cohort to understand the impact of prior experiences, particularly at eighth grade, on current circumstances, **looking ahead** to provide a basis for understanding cohort members' future experiences, **looking within** the cohort at a single point in time to compare the outcomes and experiences of different social groups, and **looking across** cohorts by comparing the experiences of the NELS:88 sophomore cohort to those of sophomores studied in 1980 in HS&B.

Three study components were carried over from the base year of NELS:88, and constitute the main first follow-up design: surveys and tests of students, and surveys of school administrators and teachers. In addition, three new components--the dropout survey, Base Year Ineligible Study, and School Effectiveness Study--were initiated in the first follow-up, and a freshened student sample was added to the student component.

As in the base year, students were asked to complete a questionnaire and cognitive test. The cognitive test was designed to measure tenth grade achievement and cognitive growth between 1988 and 1990 in the subject areas of mathematics, science, social studies (history/citizenship/geography), and reading. The student questionnaire collected basic background information, and asked students about such topics as their school and home environments, participation in classes and extra-curricular activities, current jobs, their goals and aspirations, and opinions about themselves. Also, as in the base year, two teachers of each student were asked to complete a teacher questionnaire. The teacher questionnaire sought evaluations of the sampled student, class-specific information, school level information about institutional climate and policies, and information about the teacher's background and activities. With its ratings of individual students and class-level information about students' exposure to curriculum content and instructional practices, the teacher questionnaire provides a powerful measure of the specific learning environment of each NELS:88 student. In addition, a school administrator questionnaire was completed by principals. If a student was a first-time participant in NELS:88, he or she also completed a new student supplement, containing questions on basic demographic information which were asked in the base year but not repeated in the first follow-up.

In addition to surveying students who were enrolled in school, the first follow-up also surveyed and tested youths who had dropped out of school at some point between the spring term of the 1987-88 school year and that of the 1989-90 school year. The dropout questionnaire collected information on a wide range of subjects, including reasons for leaving school, school experiences, absenteeism, plans for the future, employment, attitudes and self-concept, and home environment.

The selection of students was implemented in two stages. The first stage of sampling involved the selection of 21,474 students who were in the eighth grade NELS:88 sample in 1988. These students were termed "core" students. The core student sample was then augmented through a process called "freshening", the aim of which was to provide a representative sample of students enrolled in the tenth grade in the 1989-90 school year. This "two-stage" sampling design differs substantially from the two-stage design employed in the base year. Unlike the sampling design of the first follow-up, in the base year, eighth grade schools formed the primary sampling units, and a random sample of students within schools formed the second stage units. Consequently the base year provided representative samples of both eighth-grade students and schools, allowing for the use of both data files as stand-alone datasets. In the first follow-up, only the student dataset constitutes a representative probability sample. Freshening added 1,043

eligible tenth graders who were not contained in the base year sampling frame, either because they were not in the country, or were not in the eighth grade in the spring term of 1988.[4]

The initial data collection period for the first follow-up was from late January to July, 1990. At the end of this period, the pool of nonrespondents (for example, students who had not attended the survey session or had not been located), which was believed to possibly contain "hidden" dropouts, was subsampled and further pursued in a second data collection effort. Figure C-2 outlines the sample and subsamples of the in-school rounds; data collection results are presented in Table 1.

Table 1:
Summary of District and School Contacting and Survey Component Completion Rates
NELS:88 FIRST FOLLOW-UP (1990)

	Contacted/ Completed	Weighted	Unweighted
Contacting			
District	820	NA	99.2%
Public			
Catholic/			
Other Private	58	NA	100.0%
School			
Public	1,100	NA	99.2%
Catholic/			
Other Private	247	NA	99.2%
Instrument	**Completed**	**Weighted**	**Unweighted**
Student questionnaires	18,221	91.2%	94.2%
Student tests	17,352	94.1%[a]	95.2%[a]
Dropout questionnaires	1,043	91.0%	89.8%
Dropout tests	522	48.6%[a]	50.1%[a]
School admin. questionnaire[b]	17,663	92.0%	96.9%
School admin. questionnaire	1,291	NA	97.1%
Teacher questionnaire[c]	15,908	88.5%	88.7%

[a] Percentages of cases for which a student/dropout questionnaire was obtained for which a cognitive test was also obtained.

[b] Indicates a coverage rate (student participants who have a completed school questionnaire) for the entire student sample, including transfer students who were not eligible for the school administrator component.

[c] Coverage rate for student participants who have one or more completed teacher questionnaire. (Participating teachers = 9,987.)

[4] Additional information about the first follow-up sample design is provided in the *NELS:88 First Follow-Up Student Component Data File User's Manual* and the *NELS:88 First Follow-Up Final Technical Report.*

Design Enhancements. Two supplemental studies were undertaken in the first follow-up essentially to compensate for limitations in the NELS:88 design. At selected schools in the 30 largest MSAs, initial first follow-up student clusters were augmented to obtain a representative in-school sample of sufficient size (approximately 30 students) to sustain analyses of school effects and use of multilevel statistical techniques (for example, hierarchical linear modeling). The data collected for the School Effectiveness Study is not included on the combined base year-first follow-up release but will be made available in 1995.

The second supplemental component was the Base Year Ineligible Survey. Owing to a physical or mental disability or insufficient knowledge of the English language such that completion of a self-administered survey form would be unduly difficult or impossible, 5.4 percent of the population of students enrolled in eighth grade in 1988 were excluded from the base year survey. Exclusion of such individuals from the sampling frame results in significant undercoverage of those subpopulations who are most likely to experience difficulty in school, and to drop out of school. Also, because change over time in eligibility status is possible (for example, a student not proficient in English may become so), excluded students, if their status is not reassessed as an adjunct to the freshening process, undermine the tenth and twelfth grade representativeness of the 1990 and 1992 samples. A followback study of base year ineligibles was therefore undertaken in the first follow-up, to reassess eligibility and ascertain 1990 enrollment status.

Individuals who were found to be capable of completing first follow-up survey forms under normal conditions were "brought back into the study" and surveyed. Individuals who were found to be still incapable of participation were assessed with respect to their enrollment and this information for both newly eligible and ineligible individuals was used to derive an expanded sample national dropout rate for the eighth grade cohort of 1988[5].

NELS:88 First Follow-Up Sample and Analysis Populations

Two objectives guided the first follow-up sampling plan. First, the sample was to include approximately 21,500 students who were in the eighth-grade sample in 1988 (both participants and nonparticipants). Second, the sample was to constitute a valid probability sample of all students currently enrolled in the tenth grade in the 1989-1990 school year. This entailed freshening the sample with students who were tenth graders in 1990 but not in the eighth grade during the 1987-1988 school year. (Figure 3 illustrates the longitudinal sample design of the baseline and follow-up surveys.) The two sampling objectives of the first follow-up produced two primary analytic populations--the NELS:88 eighth grade cohort two years later (1990), and the NELS:88 sophomore cohort of 1990. These first follow-up populations are illustrated below:

[5] For expanded cohort dropout rates reported by respondent gender and race/ethnicity, and by respondent's base year school control type, region and urbanicity, see Kaufman, P., McMillen, M., & Whitener, S.D. (1991). *Dropout Rates in the United States: 1990.* Washington, D.C., National Center for Education Statistics. (NCES 91-053).

ANALYSIS POPULATIONS

PANEL ANALYSIS:
1988 8th Graders
Two Years later

Populations:

Enrolled in school--
tenth grade or
another grade

Not enrolled in school

CROSS-SECTIONAL ANALYSIS:
Sophomores in the Spring
Term of 1990

REPEATED CROSS-SECTIONAL ANALYSIS:
Sophomores in the Spring
Term of 1990 Compared to
Sophomores in Spring 1980

Populations:

1988 8th Graders in 10th grade in spring term 1990

Freshened students: spring 1990 10th graders who were not 8th graders in the 1987-88 school year. (Added to ensure 1990 NELS:88 10th grade representativeness).

The two primary populations of the first follow-up are the eighth grade longitudinal cohort, for whom two waves of survey data have been gathered, and the 1990 tenth grade sample or the sophomore class of 1990. Although the majority of the members of the sophomore class of 1990 are also members of the eighth grade longitudinal cohort--those eighth grade longitudinal cohort members who were attending tenth grade as of the spring term of 1990--the 1990 sophomore cohort, has only one wave of survey data. It is the eighth grade longitudinal cohort members for whom analyses of change and stability between 1988, as eighth graders, and 1990, as students and dropouts, can be performed. Table 2 presents basic demographic characteristics of the two primary populations of the first follow-up.

The 1990 eighth grade longitudinal cohort represents the population of 3 million adolescents who were enrolled in eighth grade two years ago in 1988. Simply put they are the eighth grade class of 1988. Thus, as in the base year, about half of the 1990 eighth grade longitudinal cohort is male and half female. Similarly, the racial/ethnic composition of this cohort in 1990 is the same as the racial/ethnic composition of this cohort in the base year. As displayed in Table 2, 3.6 percent of the 1990 eighth grade longitudinal cohort are of Asian origin, 10.4 percent are Hispanic, 13.2 percent are black, 71.4 percent are white, and 1.4 percent are American Indian or Alaskan Native.

Table 2: Composition of the eighth grade longitudinal cohort in 1990 and tenth grade cross-sectional cohort, and the freshened student cohort by selected background characteristics

	8th Grade Cohort	Freshened Students	10th Grade Cross-section
Total	3,007,812	131,385	2,823,330
Sex			
Male	50.1	55.5	49.9
Female	49.9	44.5	50.1
Race/Ethnicity			
Asian	3.6	5.7	3.9
Hispanic	10.4	21.0	10.2
Black	13.2	22.1	12.5
White	71.4	49.2	72.2
American Indian/Alaskan Native	1.4	1.9	1.2
Family Composition (as of 1990)			
Mother & Father	59.8	45.7	62.4
Mother & Male Guardian	13.3	18.0	12.9
Father & Female Guardian	3.4	3.1	3.3
Mother only	15.5	20.5	14.7
Father only	3.1	3.8	3.1
Other relative or nonrelative	5.0	9.0	3.5
1990 School Type			
Public	90.0	97.4	90.1
Catholic	6.1	1.1	6.0
Independent	1.2	.7	1.2
Other Private	2.7	.7	2.7

Table 2: Composition of the eighth grade longitudinal cohort in 1990 and tenth grade cross-sectional cohort, and the freshened student cohort by selected background characteristics (cont'd)

	8th Grade Cohort	Freshened Students	10th Grade Cross-section
Total	3,007,812	131,385	2,823,330
1990 Urbanicity			
Urban	27.8	40.3	28.3
Suburban	56.4	51.9	56.3
Rural	15.8	7.8	15.4
School Enrollment Status			
Enrolled in 10th Grade	89.0	78.4	100.0
Enrolled in Grade other 10th	4.6	NA	NA
Dropout*	6.0	21.5	NA

SOURCE: National Education Longitudinal Study of 1988, First Follow-Up Student Survey, U.S. Department of Education, National Center for Education Statistics.

Note: Owing to rounding, column subcategories may not sum to 100 percent.

* Freshened dropouts are not included in the figures reported above, which deal with freshened sample members who are part of the NELS:88 sophomore cohort, that is, were enrolled in tenth grade in the spring term of 1990. Nonetheless, the weighted dropout rate for the students brought in through freshening was, between the autumn and spring terms of the 1989-90 school year, 21.5 percent.

As of spring 1990, 89 percent of the eighth grade longitudinal cohort were enrolled in tenth grade, close to 5 percent were enrolled in a grade other than tenth (either held back or promoted ahead of their class)[6] and 6 percent had dropped out. It is this vast majority of the 1990 eighth grade cohort members (89%)--those who were in enrolled in tenth grade as of spring 1990--who make up the largest portion of the 1990 tenth grade cross-sectional cohort.

The 1990 tenth grade cross-sectional cohort represents the more than 2.8 million students who, in the spring of 1990, were sophomores. The first follow-up sophomore class of 1990 comprises those members of the eighth grade longitudinal cohort who were sophomores in 1990 and freshened students. In order to obtain a nationally representative tenth grade cross-sectional cohort, 1990 sophomores not

[6] For the 5 percent of eighth grade cohort members who had fallen out of modal grade progression, measures were not taken for separately reporting who had been held back and who had been accelerated. It is certain, however, that by far the greatest numbers of these individuals were grade retained rather than double promoted.

represented by eighth grade longitudinal cohort members who were sophomores, that is, students who were not in eighth grade in the U.S.A. two years ago but who were in tenth grade as of the spring of 1990, were added to the study. Table 2 also presents descriptive statistics on the freshened student cohort.

Although freshened students comprise only 4.7 percent of the tenth grade cross-sectional cohort, they differ strikingly from both 1990 eighth grade longitudinal cohort members and 1990 sophomores. Unlike other first follow-up cohort members, the majority (51%) of freshened students are minority (compared to 29% of the eighth grade longitudinal cohort and 28% of 1990 sophomores), male (56 percent versus 50 percent both for the eighth grade longitudinal cohort and tenth grade cross-sectional cohort); and live in a non-traditional family arrangement (only 46% of freshened students live with their mother and father; approximately 60% of other cohorts members live with their mother and father). In many ways freshened students resemble the demographic profile of early NELS:88 dropouts, the majority of whom have also repeated a grade,[7] and live in a non-traditional family arrangement (only 26% live with their mother and father).

Freshened cohort members are students who were not in eighth grade in the United States two years ago but were enrolled in the tenth grade as of the spring of 1990. The most frequently reported reason for not attending eighth grade in 1988 was being retained a grade (65%)[8], followed by "in another country" (19%), unknown (12%), and accelerated (2%). Being retained a grade is also characteristic of Limited English Proficient (LEP) students; and, LEP students represent 17 percent of the first follow-up freshened cohort. Freshened cohort students may be students who are at risk of dropping out. However, dropouts and freshened students differ on several key characteristics which may operate to lessen the likelihood of dropping out.

Availability of NELS:88 Data

NELS:88 base year and first follow-up data files are available both on magnetic tape and CD-ROM. The CD-ROM storage medium includes a DOS-based electronic codebook with search and retrieval software for use with SAS-PC or SPSS-PC+. Data files may be ordered directly from the United States Department of Education (contact the Office of Educational Research and Improvement, Data Systems Branch, 555 New Jersey Avenue NW, Washington, DC 20208-5725; 202/219-1547).

Because multilevel microdata carries with it some risk of the possibility of statistical disclosure of institutions or individual identities, the NELS:88 data have been extensively analyzed to determine which items of information, used alone or in conjunction with other key variables, have significant disclosure potential. Variables that were found to pose significant disclosure risks have been suppressed or altered to remove or substantially reduce these risks. For example, in some cases, continuous variables have been recast as categorical variables, or fine-grained categorical variables have been more grossly categorized.

While considerations of confidentiality require these alterations of the data, it is recognized that some of these protections against disclosure may at times reduce the analytic potential of certain variables in the data set. For this reason, NCES also makes **privileged use data files** available to qualified researchers with a proven need for the data in its privileged use form. To obtained the privileged use data, it is necessary for an organization to obtain a licensure agreement from NCES. The agreement must be

[7] Of all eighth grade longitudinal cohort dropouts, 61.2 percent have repeated at least one grade.

[8] Freshening reasons are reported as raw percents of the sample, rather than as weighted population estimates.

signed by the principal investigator and by someone authorized to commit the organization to the legal requirements. In addition, each professional or technical staff member with access to the data must sign and have notarized an affidavit of nondisclosure. Institutionally-based researchers may apply to the Associate Commissioner of Education Statistics at the Statistical Standards and Methodology Division, National Center for Education Statistics (NCES), 555 New Jersey Avenue NW, Washington, D.C. 20208-5651, if they wish to pursue the possibility of obtaining access to the NELS:88 privileged use data files.

Appendix D: Bibliography of NELS:88 Analysis Publications

Appendix D:
OERI NELS:88 Analysis Reports, Tabulations and Statistical Briefs:
Listing and Content Abstract

Listing of Publications

1. Hafner, A., Ingels, S.J., Schneider, B., and Stevenson, D.L. ***A Profile of the American Eighth Grader***, 1990; NCES 90-458.

2. Rasinski, K.A., and West, J. ***NELS:88: Eighth Graders' Reports of Courses Taken During the 1988 Academic Year by Selected Student Characteristics,*** 1990; NCES 90-459.

3. Hoachlander, E.G. ***A Profile of Schools Attended by Eighth Graders in 1988***, 1991; NCES 91-129.

4. Rock, D.A., Pollack, J.M., and Hafner, A. ***The Tested Achievement of the National Education Longitudinal Study of 1988 Eighth-Grade Class,*** 1991; NCES 91-460.

5. Kaufman, P., and Rasinski, K.A. ***Quality of Responses of Eighth-Grade Students to the NELS:88 Base Year Questionnaire,*** 1991; NCES 91-487.

6. McMillen, M. ***Eighth to Tenth Grade Dropouts,*** 1992; Statistics in Brief series, NCES 92-006.

7. Owings, J.A., and Peng, S. ***Transitions Experienced by 1988 Eighth Graders,*** 1992; NCES 92-023.

8. Kaufman, P., and Bradby, D. ***Characteristics of At-Risk Students in NELS:88***, 1992; NCES 92-042.

9. Bradby, D. ***Language Characteristics and Academic Achievement: A Look at Asian and Hispanic Eighth Graders in NELS:88***, 1992; NCES 92-479.

10. Horn, L., and Hafner, A. ***A Profile of American Eighth-Grade Mathematics and Science Instruction,*** 1992; NCES 92-486.

11. Horn, L., and West, J. ***A Profile of Parents of Eighth Graders***, 1992; NCES 92-488.

12. Green, P.J. ***High School Seniors Look to the Future, 1972 and 1992,*** 1993; Statistics in Brief series, NCES 93-473.

13. McMillen, M., Hausken, E., Kaufman, P., Ingels, S., Dowd, K., Frankel, M. and Qian, J. ***Dropping Out of School: 1982 and 1992,*** Issue Brief series, 1993; NCES 93-901.

14. Rasinski, K.A., Ingels, S.J., Rock, D.A., and Pollack, J. ***America's High School Sophomores: A Ten Year Comparison, 1980 - 1990,*** 1993; NCES 93-087.

15. Rock, D.A., Owings, J.A., and Lee, R. ***Changes in Math Proficiency Between Eighth and Tenth Grades.*** Statistics in Brief series, 1994; NCES 93-455.

16. Finn, J.D. ***School Engagement and Students At Risk,*** 1993; NCES 93-470.

17. Rasinski, K.A. ***The Effect of High School Vocational Education on Academic Achievement Gain and High School Persistence: Evidence from NELS:88***, 1994; Report to the Office of Research, U.S. Department of Education.

18. Ingels, S.J., Schneider, B., Scott, L.A., and Plank, S.B. ***A Profile of the American High School Sophomore in 1990***, NCES, 1994; NCES 95-086.

19. Myers, D., and Heiser, N. ***Students' School Transition Patterns between Eighth and Tenth Grades Based on NELS:88***, forthcoming; NCES 94-137.

20. Green, P.J., Dugoni, B.L., Ingels, S.J., and Camburn, E. ***A Profile of the American High School Senior in 1992***, NCES, 1995; NCES 95-384.

21. Scott, L.A., Rock, D.A., Pollack, J.M., and Ingels, S.J. ***Two Years Later: Cognitive Gains and School Transitions of NELS:88 Eighth Graders***, 1995; NCES 95-436.

22. Green, P.J., Dugoni, B.L., and Ingels, S.J. ***Trends Among High School Seniors, 1972 - 1992.*** NCES, 1995; NCES 95-380.

23. Green, P.J., and Scott, L.A. ***"At-Risk" Eighth Graders Four Years Later***, NCES, 1995; NCES 95-736.

24. Rock, D.A., and Pollack, J.M. ***Mathematics Course Taking and Gains in Mathematics Achievement.*** NCES, 1995; NCES 95-714.

25. Hoffer, T.B., Rasinski, K.A., and Moore, W. ***Social Background Differences in High School Mathematics and Science Coursetaking and Achievement.*** NCES, 1995; NCES 95-206.

26. Hoffer, T.B., and Moore, W. ***High School Seniors' Instructional Experiences in Science and Mathematics.*** Forthcoming, NCES 1995.

27. Owings, J.A., McMillen, M., Burkett, J., and Daniel, B. ***Making the Cut: Who Meets Highly Selective College Entrance Criteria?*** NCES, 1995; NCES 95-732.

28. Peng, S.S., Wright, D., Hill, S.T. ***Understanding Racial-Ethnic Differences in Secondary School Science and Mathematics Achievement.*** NCES, 1995; NCES 95-710.

29. Rasinski, K., Fleisher, M., Cederlund, A., Dugoni, B.L., and Buckley, P. ***National Education Longitudinal Study: 1988-1994, Descriptive Summary With an Essay on: Access and Choice in Postsecondary Education.*** Forthcoming, NCES, 1995; NCES 95-175.

Abstracts[1]

1. Hafner, A., Ingels, S.J., Schneider, B., and Stevenson, D.L. ***A Profile of the American Eighth Grader***, 1990; NCES 90-458.

   Descriptive statistics and associated analysis on American eighth graders are presented based on data from the 1988 National Education Longitudinal Study. The study will be repeated with the same cohort at 2-year intervals. Study variables cover attitudes, school performance, and activities of the eighth-grade students. In addition to direct student data, the study design incorporates data from students' school principals, parents, and teachers to identify additional factors that affect student achievement. In addition to a general statistical profile of the target population, statistics and accompanying analyses cover mathematics and reading performance, at-risk issues, school safety and climate, and high school and college plans. Focus is on circumstances under which children flourish and succeed. The study included a clustered, stratified national probability sample of about 800 public and 200 private schools. Almost 25,000 students participated in the base-year study. The sample represents the nation's eighth-grade population, totalling about 3 million eighth-graders in over 38,000 school in the spring of 1988. Results reveal that the American eighth-grade population is very diverse. One out of every five students is unable to perform basic arithmetic tasks, and 14% of the students are unable to perform basic reading comprehension tasks. Pertinent methodological discussions and associated data are appended. (Fifteen graphs and 69 data tables are included; 66p.)

2. Rasinski, K.A., and West, J. ***NELS:88: Eighth Graders' Reports of Courses Taken During the 1988 Academic Year by Selected Student Characteristics***, 1990; NCES 90-459.

   This set of tables examines self-reports of coursework taken by a national probability sample of eighth graders in public and private schools in the United States. Statistics were obtained from the base-year student survey of the National Education Longitudinal Study of 1988 (NELS:88). Estimates in the tables are based on a sample of 24,599 students in 1,052 schools across the nation. Technical notes follow 45 pages of tables. Three basic sets of tables on self-reported course-taking are provided in the areas of: (1) mathematics, science, and computer education (Tables 1.1 to 1.5); (2) English, foreign language, history, social studies, and religion (Tables 2.1 to 2.5); and (3) arts, vocational education, and personal development (Tables 3.1 to 3.5). Within each set of tables, the first table shows course-taking across all schools. Subsequent tables show course-taking for public, Catholic, independent private, and other private schools. In addition to information about the sample, the technical notes contain information about survey design, response rates, variables used in the tables, and methods for estimating standard errors. An appendix contains standard errors of estimates and unweighted sample sizes for levels of classification variables. (68 p.)

[1] Abstracts are taken from ERIC when available, otherwise from the NELS:88 bibliography maintained by NORC under the NELS:88 third follow-up contract.

3. Hoachlander, E.G. ***A Profile of Schools Attended by Eighth Graders in 1988***, 1991; NCES 91-129.

   As part of the National Education Longitudinal Study of 1988 (NELS:88), this study examined the schools attended by eighth-graders in 1988, the year during which the more than 25,000 eighth-graders of the cohort were first studied. NELS:88 provides information on 802 public schools, 105 Catholic schools, 68 other religious schools, and 60 private, non-religious schools. Throughout the report, the unit of analysis is the school rather than students or teachers. Most of the school data were provided by school administrators. The data are used to develop a profile of the schools attended by eighth-graders, with information about various aspects of the learning environment, school policies and programs, and administrators' assessments of school climate. In 1988, 87.9% of eighth-graders attended public schools, 7.6% attended Catholic schools, 2.9% attended other religious schools, and 1.5% attended private non-religious schools. The study shows that eighth-graders learned under a wide range of different conditions in both public and private schools. Fifty-six data tables and five graphs are included. Appendices contain technical notes, information about the accuracy of estimates and procedures, standard errors and unweighted "N"s, and 56 additional tables. (119 p.)

4. Rock, D.A., Pollack, J.M., and Hafner, A. ***The Tested Achievement of the National Education Longitudinal Study of 1988 Eighth-Grade Class,*** 1991; NCES 91-460.

   Sixty tables are presented, which examine the test achievement of a national probability sample of eighth graders in public and private schools. Statistics were obtained from the base-year student survey of the National Education Longitudinal Study of 1988 (NELS:88). Its purpose is to provide policy-relevant data concerning the effectiveness of schools, curriculum paths, special programs, variations in curriculum content, and/or mode of delivery in bringing about educational growth. The NELS:88 test battery includes four tests: (1) reading comprehension; (2) mathematics; (3) science; and (4) history/citizenship/government. This report is a tabular summary of achievement test scores for approximately 24,000 eighth graders from 1,052 schools. Results are grouped into: student background variables; parental involvement variables; and school characteristics and school climate. Reading and mathematics tables contain, in addition to mean scores, the percentage of each group scoring at each proficiency level and the standard error of the percentage estimate. Effect sizes are included to compare group differences. Technical notes on survey design, response rates, variables in the tables, significance testing, and methods for estimating standard errors and effect sizes follow the tables. (122 p.).

5. Kaufman, P., and Rasinski, K.A. ***Quality of Responses of Eighth-Grade Students to the NELS:88 Base Year Questionnaire,*** 1991; NCES 91-487.

   This report presents results of an examination of the quality of responses of eighth-grade students to a subset of variables available in the NELS:88 database. The quality of the data was assessed several ways. The correspondence between parent and student responses to similar items on the similar items on the survey instruments was examined. When data were available, the study examined consistency among responses to related items. Finally, the reliability of several scales created from NELS:88 data was assessed. The indicators of data quality suggest that NELS:88 data display a high degree of accuracy and consistency,

comparing favorably with responses from the prior NCES longitudinal study, High School and Beyond Study (HS&B). The quality of student responses to items common to both studies was somewhat less for NELS:88 eighth-graders than for HS&B high school sophomores and seniors, with quality increasing with age, and, as expected from prior research, with reading ability and socioeconomic status. There are 39 tables of NELS:88 data and 2 illustrative bar graphs. (119 p.)

6. McMillen, M. ***Eighth to Tenth Grade Dropouts,*** 1992; Statistics in Brief series, NCES 92-006.

This report presents data from the 1988 National Education Longitudinal Study (NELS:88), which started with an eighth-grade cohort and aimed to provide data on dropout experiences as students made the transition into high school and to examine the contextual school and family factors associated with dropping out. The report explains the parameters of the study, the survey methodology, and the data reliability. The data are presented in the following bar graphs: (1) 8th to 10th grade cohort dropout rates by race/ethnicity and sex; (2) 8th to 10th grade cohort dropout rates by region and metropolitan status; and (3) 8th to 10th grade cohort dropout rates by eighth- grade school (public, Catholic, religious private, and non-religious private). (7 p.).

7. Owings, J.A., and Peng, S. ***Transitions Experienced by 1988 Eighth Graders,*** 1992. NCES 92-023.

This brief report presents findings regarding two types of transitions experienced by students as they move between the eighth and 10th grades: continuing or dropping out of school and transferring between sectors. While 98% of public school students remained in public schools, over one-third of Catholic school eighth graders and over 25% of National Association of Independent Schools students transferred to public or other private schools. About 6% of all eighth graders were classified as dropouts by spring of their scheduled 10th-grade year. For most students, the move between eighth and 10th grades involves a change of schools and exposure to new educational settings. These transitions may have an impact on student learning and personal development. Consequently, differences in transition patterns and possible outcomes are of major interest. Data were obtained from the base year and first follow-up surveys of the National Education Longitudinal Study of 1988 (NELS:88), which began in 1988 with a sample of 1,052 schools and 24,599 eighth graders. In the spring of 1990, 17,424 students were studied in the first follow-up to determine their education status and progress, and school, community, and work experiences. Four tables present study data, and five graphs illustrate trends from 1988 to 1990. (13 p.).

8. Kaufman, P., and Bradby, D. ***Characteristics of At-Risk Students in NELS:88,*** 1992; NCES 92-042.

The study described in this report examined the characteristics of eighth-grade students who were at risk of school failure. The study used data from the National Education Longitudinal Study of 1988, which is a large-scale, national longitudinal study begun in the spring of 1988 when 25,000 eighth graders attending public and private schools across the nation were surveyed along with the students' parents, teachers, and school principals. The students were re-surveyed in 1990, and the base year and follow-up data of NELS:88 taken together provide

a wealth of information about eighth graders' as they move in and out of the U.S. school system and into the varied activities of early adolescence. This study, focused on at-risk students within the eighth-grade cohort, examined the following sets of variables: (1) basic demographic characteristics; (2) family and personal background characteristics; (3) the amount of parental involvement in the student's education; (4) the students' academic history; (5) student behavioral factors; (6) teacher perceptions of the students; and (7) characteristics of the students' schools. Black, Hispanic American, and Native American students and students from low-socioeconomic backgrounds were more likely to be at-risk. Male eighth graders were more likely to have low basic skills, but were no more likely to drop out. After controlling for sex and socioeconomic status, Black and Hispanic American dropout rates were found to be the same as that for Whites. However, even when controlling for sex and economic status, Black and Hispanic American students were more likely than White students to perform below basic proficiency levels. (Included are 15 tables in the text and 31 tables in 2 appendixes; 107 p.).

9. Bradby, D. ***Language Characteristics and Academic Achievement: A Look at Asian and Hispanic Eighth Graders in NELS:88***, 1992; NCES 92-479.

This report examines the demographic and language characteristics and educational aspirations of Asian American and Hispanic American eighth graders and relates that information to their mathematical ability and reading comprehension as measured by an achievement test. Special attention is paid to students who come from homes in which a non-English language is spoken. Of the 1,505 Asian American students evaluated, 73 percent were reported as language minorities (LMs), while 77 percent of the 3,129 Hispanic American students evaluated were LMs. Of the LM students, 66 percent of the Asian Americans had high English proficiency as compared to 64 percent of the LM Hispanic Americans. Both Asian American and Hispanic American groups had 4 percent of LM students showing low English proficiency. Overall, the study found many similarities between the two groups. However, differences are apparent when data are divided along language proficiency, mathematics achievement, aspiration, and other measures. Statistical data are provided in 33 tables and 44 graphs. Appendices present selected survey questions, technical notes and methodology, and 109 standard error tables. (197 p.).

10. Horn, L., and Hafner, A. ***A Profile of American Eighth-Grade Mathematics and Science Instruction***, 1992; NCES 92-486.

This report profiles the mathematics and science instruction received by eighth graders (11,414 eighth graders had teacher reports in mathematics and 10,686 in science) in public and private schools in 1988. A preface lists highlighted findings, tables, and figures included in the document. The body of the report consists of five chapters. Chapter I discusses the purpose and format of the report and limitations of the study. Chapters II and III examine the relationship of various aspects of mathematics and science instruction to students' socioeconomic status and race-ethnicity and type of school attended. Among the aspects examined were the major topics taught, average class size, hours per week attended, allocation of class time, assigned homework, availability of instructional materials, student attitudes toward mathematics and science, and teacher characteristics and qualifications. Chapter IV

examines mathematics and science achievement test scores in relation to the various components of instruction measured in the study. Chapter V provides a descriptive profile of the mathematics curriculum, the science curriculum, teacher characteristics and qualifications, classroom characteristics, school type differences, and students' opportunity to learn based on the findings. Appendices that describe the methodology employed and standard errors of estimates reported in tables and figures in the text are provided. (121 p.).

11. Horn, L., and West, J. ***A Profile of Parents of Eighth Graders***, 1992; NCES 92-488.

    This report profiles the family characteristics and the level of involvement reported by the parents of 1988 eighth graders, using the base year survey and dropout data from the first follow-up. About 93 percent of the parents of the first year sample were interviewed to provide information about home life and family experiences. This study examined child-directed involvement, including activities such as parent-child discussions and school-directed involvement such as parent-teacher association membership and volunteering in the school. There was some indication that parent involvement was related to whether or not students scored below the basic level in reading or mathematics proficiency, but there was a strong relationship between parent involvement and whether or not a student dropped out of school between the 8th and 10th grades. There are 26 tables and 18 figures presenting study findings. (121 p.).

12. Green, P.J. ***High School Seniors Look to the Future, 1972 and 1992,*** 1993; Statistics in Brief series, NCES 93-473.

    In light of the many changes of the past 20 years, it may be expected that plans of high school seniors for further education may have also changed, along with the kinds of jobs they expect to have and the things they regard as important. These questions are examined through data from the National Longitudinal Study of 1972 (NLS-72) and the National Education Longitudinal Study in 1988 (NELS:88), the 1992 Second Follow-Up. The proportion of seniors in academic or college preparatory programs was approximately the same in both years, although enrollment in the general track increased and enrollment in vocational education decreased. In 1992, there was little difference between the sexes in high school program placement. In 1992, only 5.3 of students reported that they would not attend some kind of school after high school, but in 1972, 18.9% had reported that they would not continue. Eighty-four percent in 1992 planned to go to college, compared with the 63% who planned to attend in 1972. Differences for females were dramatic, with female seniors in 1992 four times more likely to plan on graduate or professional school as in 1972. Nearly 60% in 1992 planned a professional career, compared with approximately 45% in 1972. Changes in values were most marked among women, who in 1992 espoused values closer to those traditionally held by men. One figure and three tables present data about the two populations. (6 p.)

13. McMillen, M., Hausken, E., Kaufman, P., Ingels, S., Dowd, K., Frankel, M. and Qian, J. ***Dropping Out of School: 1982 and 1992,*** Issue Brief series, 1993; NCES 93-901.

    In recent years, concern over students dropping out of school has increased. A primary focus is the size of the dropout population, a question that has been addressed in two National Center for Education Statistics (NCES) longitudinal studies. Both studies provide the data needed to consider the dropout experiences between the sophomore and senior years of two groups of students a decade apart in time. Over the 10 years between the 1980-82 High School and Beyond survey (HS&B) and the 1990-92 data from the National Education Longitudinal Study of 1988 (NELS:88) (follow-ups), there was a 43 percent reduction in the percent of sophomores who dropped out of school. The NELS:88 rate for the sophomore cohort of 1990 is 6.2 percent. Relative rankings for racial and ethnic groups did not change over the decade, and in both cohorts the dropout rates for Hispanics were higher than those for Whites and Asians. Rates for Blacks were between those of Hispanic Americans and Whites. In both periods, failure in school and dislike for school were major factors leading students to drop out of school. Pregnancy and marriage were important factors influencing females' decisions to leave school early. Three figures illustrate the discussion. (3 p.)

14. Rasinski, K.A., Ingels, S.J., Rock, D.A., and Pollack, J. ***America's High School Sophomores: A Ten Year Comparison, 1980 - 1990,*** 1993; NCES 93-087.

    This study of high school sophomores in 1980 and 1990 compares the experiences of students in the two cohorts, identifying changes in in-school and out-of-school activities, academic achievement, self-concept, values, plans, and aspirations. Similarities and differences between the two groups are documented using data from the National Education Longitudinal Study of 1988 (NELS:88) and High School and Beyond (HS&B, 1980). HS&B and NELS:88 sophomores are marked by basic demographic differences, including the smaller size of the NELS:88 1990 cohort, reflecting the baby bust of the 1970s, and a higher proportion of racial minority and poverty status sophomores in 1990. NELS:88 sophomores also reflect the influence of various waves of school reform since the late 1970s and early 1980s. Overall, the comparison paints a pictures that is in most respects encouraging in its portrayal of the high school academic orientation and postsecondary expectations of the 1990 sophomore class. Positive changes, however, are typically small or moderate in magnitude. Among the findings are: (1) general and college preparatory program placement has increased, at the expense of vocational program placement; (2) patterns of extracurricular participation changed especially in musical activities (31% in 1980 to 22% in 1990) and in hobby clubs (21% in 1980 to 7% in 1990); (3) changes in sophomores giving high importance to particular life values (e.g., marriage and family 83% rating this as very important in 1980, 72% in 1990); (4) small but statistically significant increase in the number of females aspiring to traditionally male-dominated non-professional occupations (15.6% in 1980 versus 18.% in 1990). Sixteen tables and 13 figures present data from the 2 studies. Three appendixes contain information about the survey sample sizes, standard errors, and other methodological and technical information. Appendix A contains an additional 20 data tables. (Contains 46 references; xiv, 98 p.)

15. Rock, D.A., Owings, J.A., and Lee, R. ***Changes in Math Proficiency Between Eighth and Tenth Grades.*** 1994; NCES 93-455.

    This report in the NCES Statistics in Brief series illustrates use of the NELS:88 dichotomous proficiency scores for conducting achievement gain analysis (see Scott, Rock, Pollack and Ingels [entry 21] for an illustration of an alternative gain analysis strategy, the use of continuous probability of mathematics proficiency scores). The findings presented in this report suggest that course-taking patterns in mathematics between eighth grade and the sophomore year of high school represent an important factor in explaining growth in math proficiency. For example, even after controlling for eighth-grade math proficiency, higher math gains were associated with course-taking patterns that reflected advanced level math courses. The report also suggests that eighth-grade students who have higher aspirations for postsecondary education are also more likely to show positive math gains. (20 p.)

16. Finn, J.D. ***School Engagement and Students At Risk,*** 1993; NCES 93-470.

    To examine the proposition that students who do not remain active participants in class or school may be at risk for school failure, regardless of status characteristics such as ethnicity or family income, two studies of engagement and achievement were conducted. The studies used a nationwide sample of eighth-grade students from the U.S. Department of Education's National Educational Longitudinal Study of 1988 (NELS:88) survey. The first study examined the association of participation in school and classroom activities with academic achievement in 15,737 eighth-graders attending public schools. The study found that participation and academic achievement were positively related, even after controlling for gender, ethnicity, and socioeconomic status. The second study examined behaviors that distinguish students who are at risk, but who are successful in school subjects, from their less successful peers. A sample of 5,945 eighth-graders identified as at risk by virtue of race, home language or socioeconomic status were classified as unsuccessful, passing, or successful, based on reading and mathematics achievement tests. It was found that achievement groups were distinct in terms of variety of classroom participation behaviors, out-of-class participation, and interactions with their parents regarding school. Three major conclusions were drawn from the investigation: (1) behavioral risk factors are indeed related to significant outcomes of schooling; (2) risk behaviors have their roots in the early school years or before; and (3) more attention should be given by educators and researchers to encouraging the potential of "marginal" students. Further research is needed to identify manipulable aspects of classroom and school processes that encourage student engagement. Appendices provide details of the measures used in the studies and the standard deviations and correlations of the measures. Contains 91 references. (117p.).

17. Rasinski, K.A. ***The Effect of High School Vocational Education on Academic Achievement Gain and High School Persistence: Evidence from NELS:88***, 1994; Report to the Office of Research, OERI, U.S. Department of Education.

    This analysis of the effects of vocational education on academic achievement and high school persistence was prepared for the National Assessment of Vocational Education. Data from the NELS:88 high school transcript study were analyzed to assess the influence of vocational programs and vocational courses on gains in tested achievement in mathematics, science and

reading. The analysis also addresses the issue of whether, regardless of their effect on achievement gain, vocational programs serve to keep students from dropping out of high school.

18. Ingels, S.J., Schneider, B., Scott, L.A., and Plank, S.B. ***A Profile of the American High School Sophomore in 1990***, 1994; NCES 95-086.

This cross-sectional statistical analysis report supplies descriptive analyses of the educational situation of a representative sample of the nation's 1990 sophomores (comprising 1988 eighth-grade cohort members who were in tenth grade in the spring term of 1990 and "freshened" sophomores, students new to the sample who were not in the base year sampling frame, either because they were not 1987-88 eighth graders or not in the United States). *Chapter 1* provides an in-depth view of tenth-grade learning and achievement in mathematics. *Chapter 2* supplies a summary of tenth-grade course-taking patterns and instructional practices in science, reading, social studies, and foreign language. *Chapter 3* explores the tenth grader's life outside of school, including the process of educational decision making. *Chapter 4* reports on sophomores' plans for the future, including their educational expectations and aspirations. Taken together, these four chapters provide a statistical profile of the American high school sophomore in 1990, which is summarized in *Chapter 5*. Appendices A and B provide technical notes and tables of standard errors of measurement and sample sizes for all reported population estimates. Appendix C contains further information about NELS:88 in general and the first follow-up in particular. Appendix D presents additional tabulations on reading and social studies achievement. (267 p. [including appendices] 29 data tables [plus 3 Appendix D supplemental tables], 12 figures)

19. Myers, D., and Heiser, N. ***Students' School Transition Patterns between Eighth and Tenth Grades Based on NELS:88***, forthcoming; NCES 94-137.

Analysis of NELS:88 data makes it possible to explore the relationships between student and family characteristics and the likelihood of shifting among public and private schools as students progress from eighth to tenth grade. This study examines the characteristics of students who switch between sectors (public to private, or private to public) as they move from eighth to tenth grade. Five sets of variables were examined to estimate the association between variations in the students' transition patterns and student and family characteristics: (1) basic student and family background characteristics; (2) the amount of parental involvement in the student's education; (3) the student's academic achievement and educational expectations; (4) the characteristics of the student's school; and (5) parental satisfaction with the student's school. Examination of these characteristics permits four research questions to be addressed: (1) How many students shift between the public and private school sectors? How many students shift from one private school to another?; (2) Who shifts between sectors? Are family background factors, parental involvement, or students' academic achievement or educational expectations associated with variations in transition patterns?; (3) Are school characteristics associated with students' propensity to move between school sectors?; (4) Do parents who are dissatisfied with their children's school shift their children to another type of school?

20. Green, P.J., Dugoni, B.L., Ingels, S.J., and Camburn, E. ***A Profile of the American High School Senior in 1992,*** NCES, 1995; NCES 95-384.

    This statistical analysis report examines the background of 1992 high school seniors, the school environment which shaped their senior year experiences, the curriculum in which they were enrolled, their academic achievement, their plans and expectations for the future, and their non-academic experiences during this important period of development. *Chapter 1* provides a demographic profile of high school seniors. *Chapter 2* depicts their school and peer environment by recording seniors' perceptions of school, of the safety of their school, and of the values of their peers. *Chapter 3* describes their course and program enrollments. *Chapter 4* examines the tested achievement of 1992 seniors. *Chapter 5* describes their short-term plans--their postsecondary plans, steps they have taken to gain entrance to college, and factors they considered in choosing a postsecondary institution. *Chapter 6* reports on seniors' plans and expectations for the future. Finally, *chapter 7* describes the senior cohort's experiences outside of school--use of illicit drugs and alcohol, television viewing, jobs, participation in school government, and community volunteer work. Taken together, these seven chapters provide a statistical profile of the American high school senior in 1992. Appendices provide unweighted (sample) Ns and standard errors. (291 p., 33 tables, 18 figures)

21. Scott, L.A., Rock, D.A., Pollack, J.M., and Ingels, S.J. ***Two Years Later: Cognitive Gains and School Transitions of NELS:88 Eighth Graders***, 1995; NCES 94-436.

    This statistical analysis report describes the growth in cognitive skills and achievement, and the continuities and discontinuities experienced in school and at home by the NELS:88 eighth grade-cohort during the two years between the study's base year (1988) and first follow-up (1990) surveys. Four distinct topics are addressed, involving both school dropouts and persisters. (1) By 1990, some 1988 eighth graders were dropouts; this report describes their characteristics and the reasons they gave for dropping out of school. (2) This report presents findings on patterns of school transition--changing from a public eighth-grade school to a private high school or vice versa--and the changes in perception of safety and overall learning environment cohort members experienced after moving from a typically more homogeneous middle school environment to a more heterogeneous high school environment. (3) Additionally, this report summarizes major changes in home life and family, such as the divorce or remarriage of a parent, that also occurred during cohort members' transition to and/or early years of high school. (4) Finally, this report examines the 1988-90 achievement gain of the eighth-grade cohort, thus addressing several basic questions: How much did students gain in achievement in the two years following eighth grade?; Who gained, in what subjects, and (for mathematics) where or in what way (that is, at what skill or proficiency level)? The qualitative analysis of growth in mathematics achievement illustrates use of the NELS:88 continuous measure of probability of proficiency (see Rock, Owings and Lee [1994, entry 15] for an illustration of gain score analysis using NELS:88 dichotomous mathematics proficiency scores).

22. Green, P.J., Dugoni, B.L., and Ingels, S.J. ***Trends Among High School Seniors, 1972 - 1992.*** NCES, 1995; NCES 95-380.

This statistical analysis report compares the NLS-72 1972, HS&B 1980, and NELS:88 1992 senior cohorts. It supplies a sociodemographic description of the three senior cohorts. The report compares the cohorts' high school program placement, course-taking and achievement, as well as participation in extracurricular activities. It also compares 1972, 1980 and 1992 seniors' plans for the next year, noting the proportions who planned to work full-time in the year following graduation, the type of postsecondary institution seniors planned to attend, college selection, and major field of study. Finally, the report compares the future educational and occupational aspirations of the three senior cohorts. (168 p., 21 data tables and 9 figures)

23. Green, P.J., and Scott, L.A. ***"At-Risk" Eighth Graders Four Years Later,*** NCES, 1995; NCES 95-736.

This publication in the NCES Statistics in Brief series extends to the 1992 second follow-up the analysis of "at risk" factors begun by Hafner, Ingels, Schneider, and Stevenson (1990) with the base year data and continued by Scott, Rock, Pollack and Ingels (1995) with the first follow-up data. Approximately 26 percent of eighth grade students had an "at risk" characteristic and 20 percent had two or more of these risk factors. Examining the outcomes of at-risk eighth graders four years later (1992), Green and Scott examine both achievement outcomes and social and behavioral outcomes. With respect to achievement, Green and Scott report that (1) approximately one in six adolescents with multiple risk factors were unable to comprehend basic written information, testing below the basic level in reading in 1992. In comparison, only about one in twenty of those with no risk factors were unable to demonstrate basic reading skills. (2) At-risk students were more likely than others in 1992 to test poorly in mathematics. Over half of those with multiple risk factors tested at the basic level, or below, In contrast, only about a fifth of those with no observed risk factors tested at that level. (3) Nearly one-third of students with multiple risk factors could not demonstrate even a "common knowledge" of science. Only 12.2 of students with no risk factors failed to demonstrate competence at this basic level. In respect of 1992 social and behavioral outcomes, and 1992 graduation status, Green and Scott report (1) Students who had multiple risk factors in 1992 were **no more likely** than others to report using illicit drugs (marijuana or alcohol), or to report abusing alcohol than those with no risk factors. (2) Eighth graders who had multiple risk factors in 1988 were more likely than others to have a child in 1992--18.9 percent compared to 5.4 percent. (3) Students with multiple risk factors were more likely than others to report being suspended, and being sent to a juvenile home or detention center. (4) Among 1988 eighth graders with no risk factors, ninety percent had earned a high school diploma by 1992. Among 1988 eighth graders with multiple risk factors, sixty percent had earned their high school diploma by 1992, while the other forty percent had not.

24. Rock, D.A., and Pollack, J.M. ***Mathematics Course Taking and Gains in Mathematics Achievement.*** NCES, 1995; NCES 95-714.

This publication in the NCES Statistics in Brief series extends to the 1992 second follow-up the analysis of 1988-1990 test score gains reported in Scott, Rock, Pollack and Ingels (1995). However, instead of self-report data on courses completed, Rock and Pollack utilize the results of the NELS:88 high school transcript study. Rock and Pollack found that when student gains

in tested mathematics achievement were cross-classified by grade in school and highest level of mathematics course taken:

- Slightly over 60 percent of high school students do not go beyond the algebra 2/geometry level of coursework.
- Approximately 1 out of 9 students take a calculus course while in high school; about 1 out of 4 students, in contrast, never go past algebra in their high school career.
- Growth in arithmetic, algebra, and geometry achievement appears to be greater in the first two years of high school than in the last two years for almost all course-taking categories.
- Students who take the more advanced mathematics courses show greater gains, both between 8th and 10th grade, and between 10th and 12th grade.
- Students who do not take advanced courses make greater gains on test items dealing with computational skills, while students in the advanced courses make larger gains on test items requiring conceptual understanding and problem-solving skills. In fact, for these students, significant growth does not occur until they move into the pre-calculus level of coursework.

25. Hoffer, T.B., Rasinski, K.A., and Moore, W. ***Social Background Differences in High School Mathematics and Science Coursetaking and Achievement.*** NCES, 1995; NCES 95-206.

This publication in the NCES Statistics in Brief series uses NELS:88 test and transcript data to address two questions: (a) To what extent do students from different social backgrounds differ in the numbers of courses they complete during high school and in their final levels of academic achievement? And (b) Does additional coursework have comparable relationships to measured achievement gains during the high school years for students from different backgrounds. Hoffer, Rasinski and Moore report the following findings: (1) Gender differences in the numbers of science and mathematics courses students complete are not significant. Students from higher socioeconomic families, however, complete more courses in these subjects. (2) The numbers of math and science courses students complete in high school are strongly related to how much their test scores increase from the end of eighth grade to the end of senior year. (3) Additional coursework pays off about equally for all students in terms of increasing achievement gain, regardless of gender, race-ethnicity, and social class.

26. Hoffer, T.B., and Moore, W. ***High School Seniors' Instructional Experiences in Science and Mathematics.*** Forthcoming, NCES 1995.

This statistical analysis report examines the instructional experiences of high school seniors in the subjects of science and mathematics. Two general questions are addressed: Why do students' experiences differ? and What consequences do the differences have for student academic achievement? The authors report that (1) student background variables are associated with instructional differences, but these associations are mostly reflections of the correlation of student background variables with the achievement level or track of the class. The most

powerful predictor of instructional differences is the track of the class, which overshadows the influence of social background and school characteristics. (2) Some effects of background persist even after the impact of track level is factored out. (3) School policy variables have significant effects on several aspects of instruction. (4) Most instructional measures examined for mathematics show significant associations with learning. For example, controlling for sophomore achievement, social background, school characteristics, track, and teacher credentials, the finding persists that students whose teachers place greater emphasis on higher-order skills and lower emphasis on practical applications learn more.

27. Owings, J.A., McMillen, M., Burkett, J., and Daniel, B. ***Making the Cut: Who Meets Highly Selective College Entrance Criteria?*** NCES, 1995; NCES 95-732.

    This Statistics in Brief publication reports on use of NELS:88 data to categorize college-bound seniors on each of five criteria thought to be representative of those required for admission to highly selective colleges. The criteria were: (1) a high school GPA of 3.5 or higher; (2) a score of 1100 or higher on the SAT; (3) a course-taking pattern that included four English credits, three mathematics credits, three science credits, three social studies credits, and two foreign language credits; (4) positive teacher ratings regarding the student; and (5) participation in two or more school-related extracurricular activities. Only about six percent of 1992 college-bound seniors met all criteria. When the five criteria were considered separately, the percentage meeting the individual criteria ranged from 19.2 percent for GPA and 22.0 percent for SAT scores to 67.7 percent for participation in extracurricular activities. Differences by subgroups (sex, race/ethnicity, socioeconomic status, and high school sector). (12 p.)

28. Peng, S.S., Wright, D., and Hill, S.T. ***Understanding Racial-Ethnic Differences in Secondary School Science and Mathematics Achievement.*** NCES, 1995; NCES 95-710.

    This study was designed to address two related issues: Why are blacks, Hispanics, and American Indians underrepresented in science and mathematics-related fields, and why do students of these minority groups have lower achievement test scores in science and mathematics than other students? Using NELS:88 base year and first follow-up data, variables such as educational activities at home, coursework in school, teacher qualifications, school environment, and student learning behavior were analyzed separately and jointly. The report outlines specific home, school and individual factors associated with lower science and math achievement for blacks, Hispanics, and American Indians. In addition, the report suggests several areas for further research on ways of reducing these achievement gaps in mathematics and science.

29. Rasinski, K., Fleisher, M., Cederlund, A., Dugoni, B.L., and Buckley, P. ***National Education Longitudinal Study: 1988-1994, Descriptive Summary With an Essay on: Access and Choice in Postsecondary Education.*** Forthcoming, NCES, 1995; NCES 95-175.

    This statistical analysis report is based on data from 1988 eighth graders as of the 1994 round (third follow-up) of NELS:88. The report provides data tables on educational experiences,

including educational expectations and postsecondary enrollment status; tables on labor force participation and earnings; reported sexual experiences as well as data on marital status and family formation; and data tables on life values, leisure time activities, and civic participation. An extended essay examines the postsecondary education access and choice of this nationally representative sample, detailing the postsecondary educational experiences of individuals with different backgrounds and different high school experiences. The report contains 52 tables, an appendix of technical notes, and a glossary.

30. Hoffer, T.B., Scott, L.A. ***Using the NELS:88 School Effects Supplement to Estimate Multilevel Models of Student Outcomes.*** NCES, 1995 (forthcoming). This brief report (Leslie, fill in with 2 or 3 sentences).

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